Gas Boiler Controls Wiring & Application Guide

Featuring Burnham® Brand IQ Boiler Control
and Intelligent Hydronic Control Systems

IQ boiler control

Intelligent Hydronic Control

Burnham by U.S. Boiler Company

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1.0 Introduction

Intelligent Hydronic Control and IQ Control Systems included on various Burnham Brand boilers contain features and capabilities, which can improve heating system operation, reduce fuel costs, improve comfort, and efficiency. By including unique capabilities, Burnham brand boilers can do more, with less field wiring, and fewer aftermarket controls and components – improving the operation of both new and replacement boiler installations.

These application drawings include detailed wiring diagrams, and set-up details, allowing installers to fully utilize the capability and versatility of the control systems. These applications can save installers time and money on just about any heating system – whether it's a new installation, or replacing an older, less efficient boiler.

Notice:
While this manual contains wiring diagrams and set-up details, the Installation Operating and Service Instruction's provided with each Burnham brand boiler must be followed.

Notice:
Install wiring and electrically ground boiler in accordance with requirements of the authority having jurisdiction, or in absence of such requirements the National Electrical Code, ANSI/NFPA 70, and/or the CSA C22.1 Electric Code.

Using this Guide

Line Voltage

L1 – 120Vac Hot – Black
L2 – 120Vac Neutral - White
Ground - Green

Abbreviations

IHC	Intelligent Hydronic Control
OCP	IQ Option Panel
TPI	Alliance IWH control
IQ	(Gas Boiler System) Combination of IHC and OCP on the boiler
"T-T"	Thermostat connection terminals

Low Voltage

Polarity Important
Red 24 Vac Hot
White (Grey) 24Vac Ground

Polarity Not Important
Blue wires

2.0 IQ Gas Boiler Control System

The Burnham ES2, ESC & Series 3 boilers feature Burnham's IQ gas Boiler Control system, which greatly simplifies installation and set-up in both existing and new heating systems. The IQ Control system contains many unique features and capabilities that save the installer time and take the mystery out of controls by providing simple, clear information about settings, status, and diagnostics on an LED display on the boiler. The IQ gas Boiler Control System consists of the following components:

Intelligent Hydronic Gas Boiler Control features an integrated boiler temperature sensor, and ignition control into one for seamless operation. The Intelligent Hydronic Control features an LED read-out, which displays operating information such as boiler status and boiler water temperature. The Intelligent Hydronic Control also displays diagnostic info such as run time hours, the number of heating cycles, flame signal strength, and error codes for improved diagnostics

The IQ Option Panel is a separate control panel that accepts IQ Option Cards for added efficiency and safety. IQ Option Cards snap into any one of the three Slots in the Option Panel, and are instantly recognized when the IQ System is powered up. A separate LED display provides setting, status, & diagnostic info for each of the IQ Option Cards, greatly simplifying the set-up and operation of the control. IQ Option Cards are cost effective, they save time, and they are functionally superior to stand alone Limits, LWCO's and Outdoor Reset controls. Not available with the Series 2 Boiler.

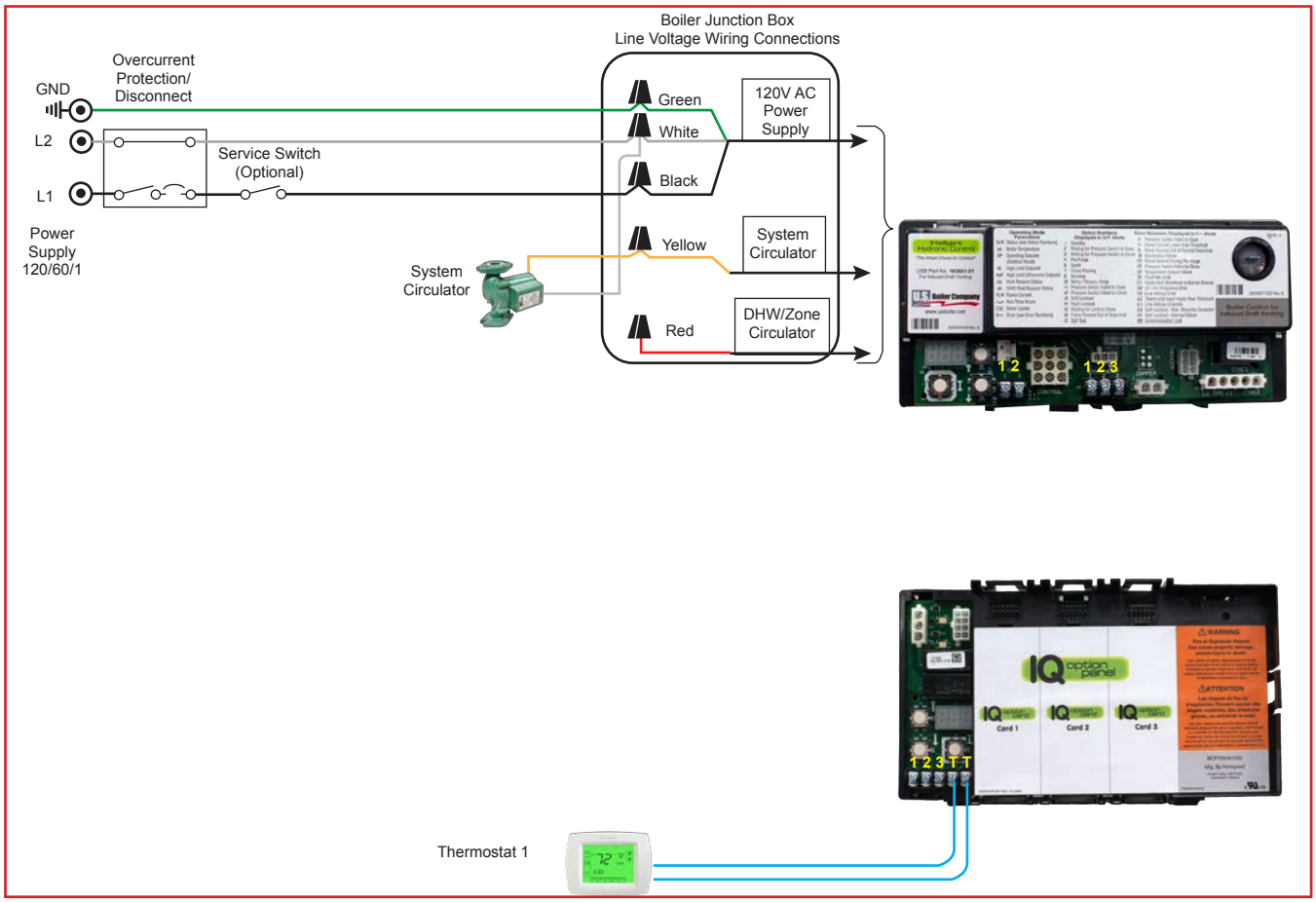
IQ Option Cards are snap-in control modules which attach to the Option Panel, and contain various control upgrades, such as Auxiliary High Temperature Limit, Low Water Cut-Off protection, and Outdoor Air Reset. There's an IQ Option Card for each feature. Option Cards simply plug into the Option Panel, and feature a one or two wire connection to a sensor. Not available with the Series 2 boiler.

Intelligent Hydronic Control Adjustment Mode Options

The Intelligent Hydronic Control's (IHC) "dh" parameter provides the ability to control the two separate heating demands or a heating demand and an Indirect Water Heater (IWH) demand without the use of additional controls.

Parameter	Range	Parameter Description	Default
HL	140°F – 220°F	High Limit Setting	180°F
dF	10°F – 30°F	High Limit Differential	15°F
Or	0 – 20 Minutes	Circulator Overrun Time	0 Minutes
PP	2 –20 Minutes	Circulator Pre-purge Time	2 Minutes
St	140°F –180°F	Start Temperature	140°F
Pt	On – Off	Priority Time (DHW)	On
dh	Dh or TT2	DH Terminal Function	dh
F-C	F or C	Degrees F or C	F

2.1 Single Zone Heating

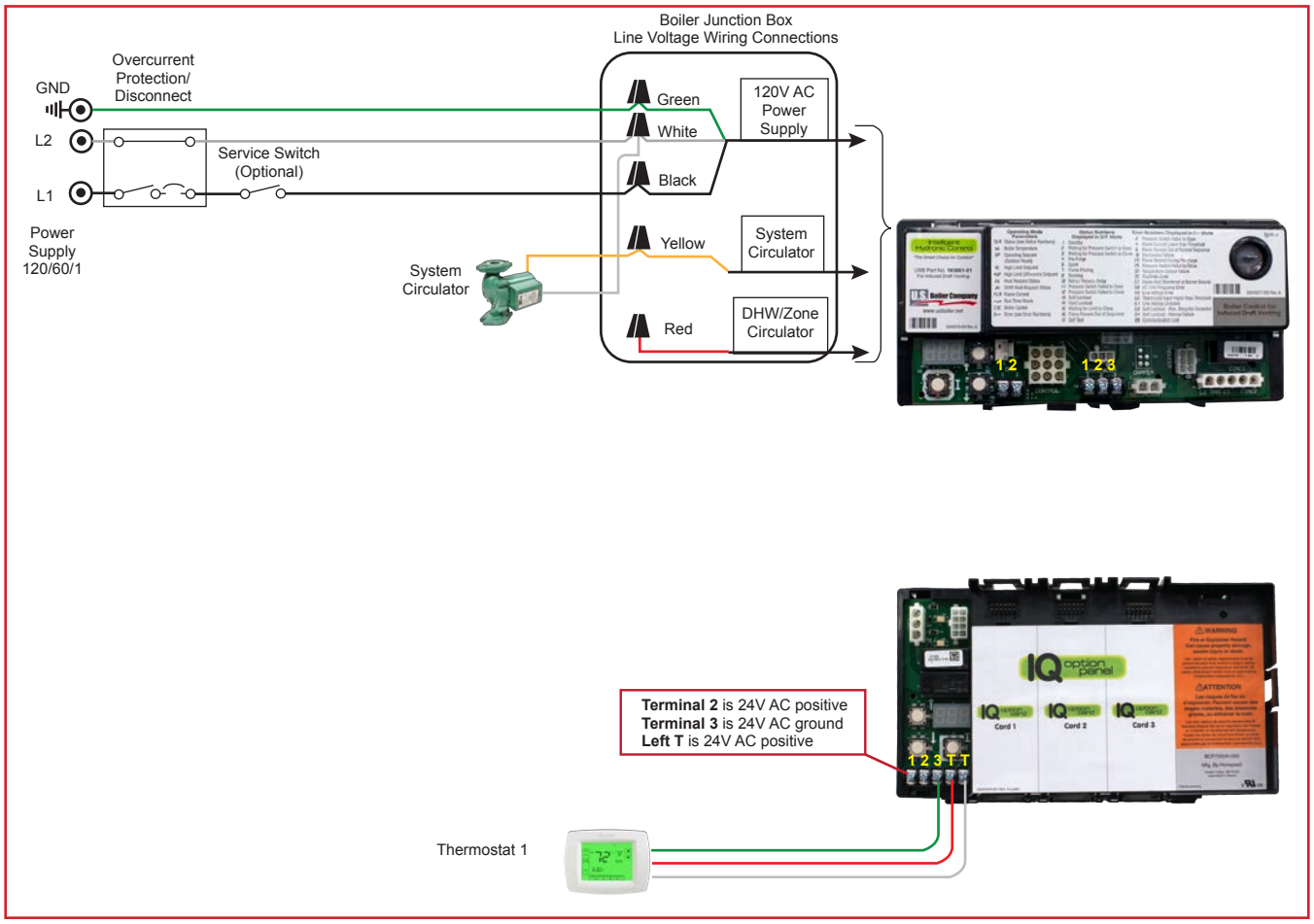


Explanation:

This arrangement can be used when an IQ gas boiler is connected to a single zone heating system.

- A thermostat wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system wire.

2.2 Single Heat Zone, Power Stealing Thermostat

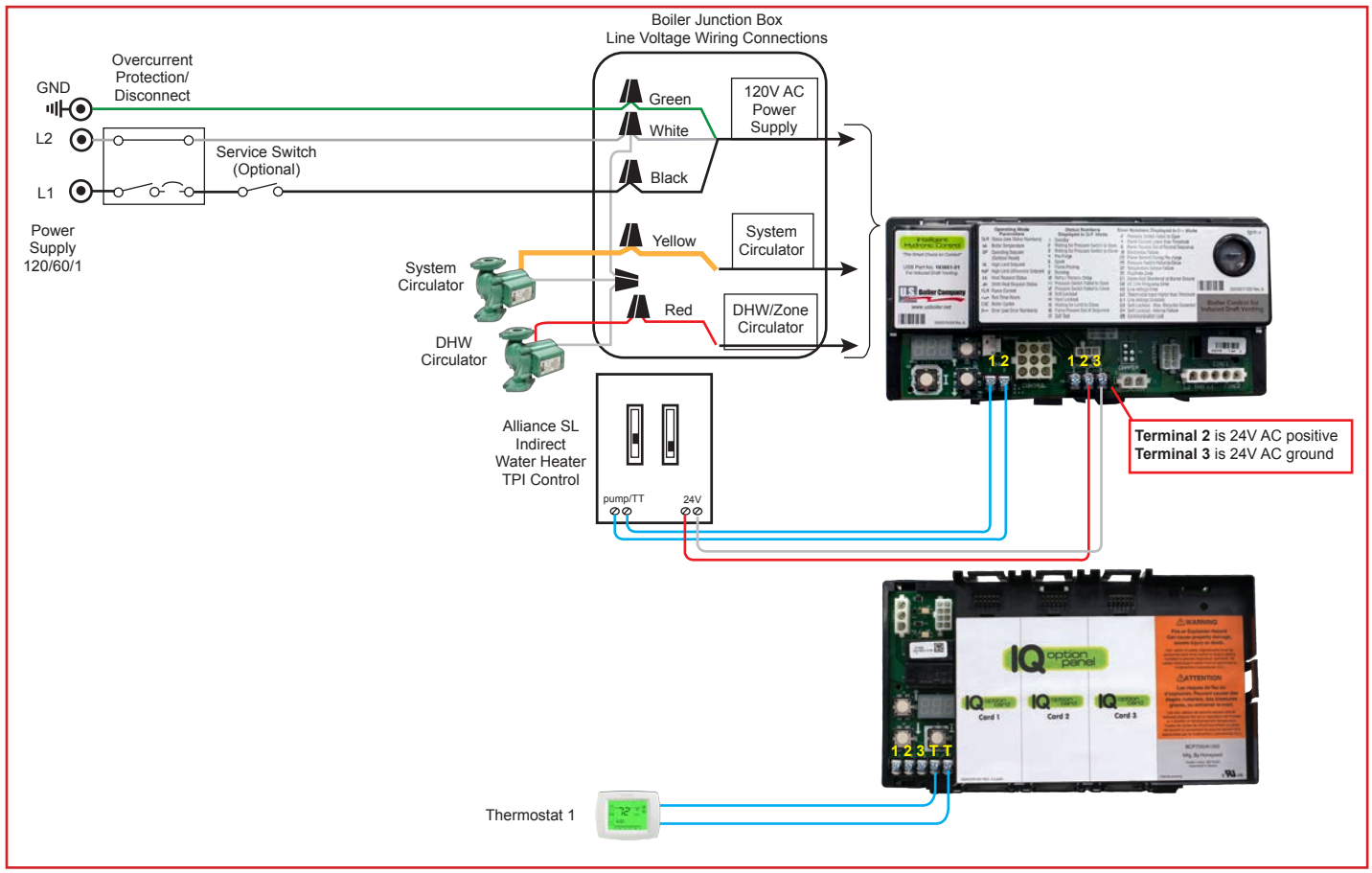


Explanation:

This arrangement can be used with a single zone heating system with a power stealing thermostat

- A thermostat wired to the OCP “TT” terminals provide a heating demand and energizes the yellow system circulator wire.

2.3 Single Heat Zone Heating, IWH w/TPI Control

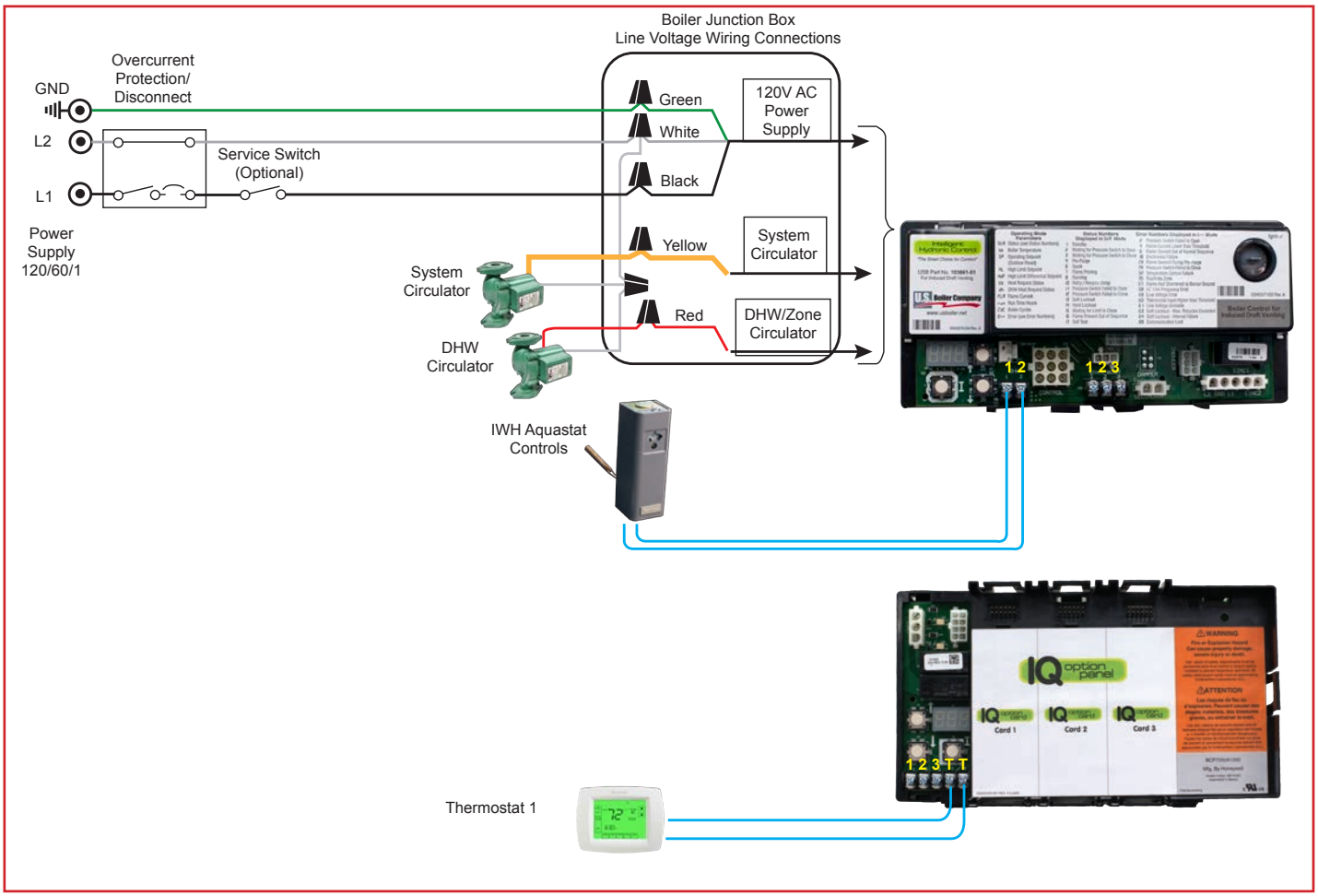


Explanation:

This arrangement can be used with a single heat zone and DHW demand from the TPI control.

- A thermostat wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI control wired to the IHC "1" & "2" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parmater "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without at time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI controls.

2.4 Single Heat Zone Heating, IWH w/Aquastat Control

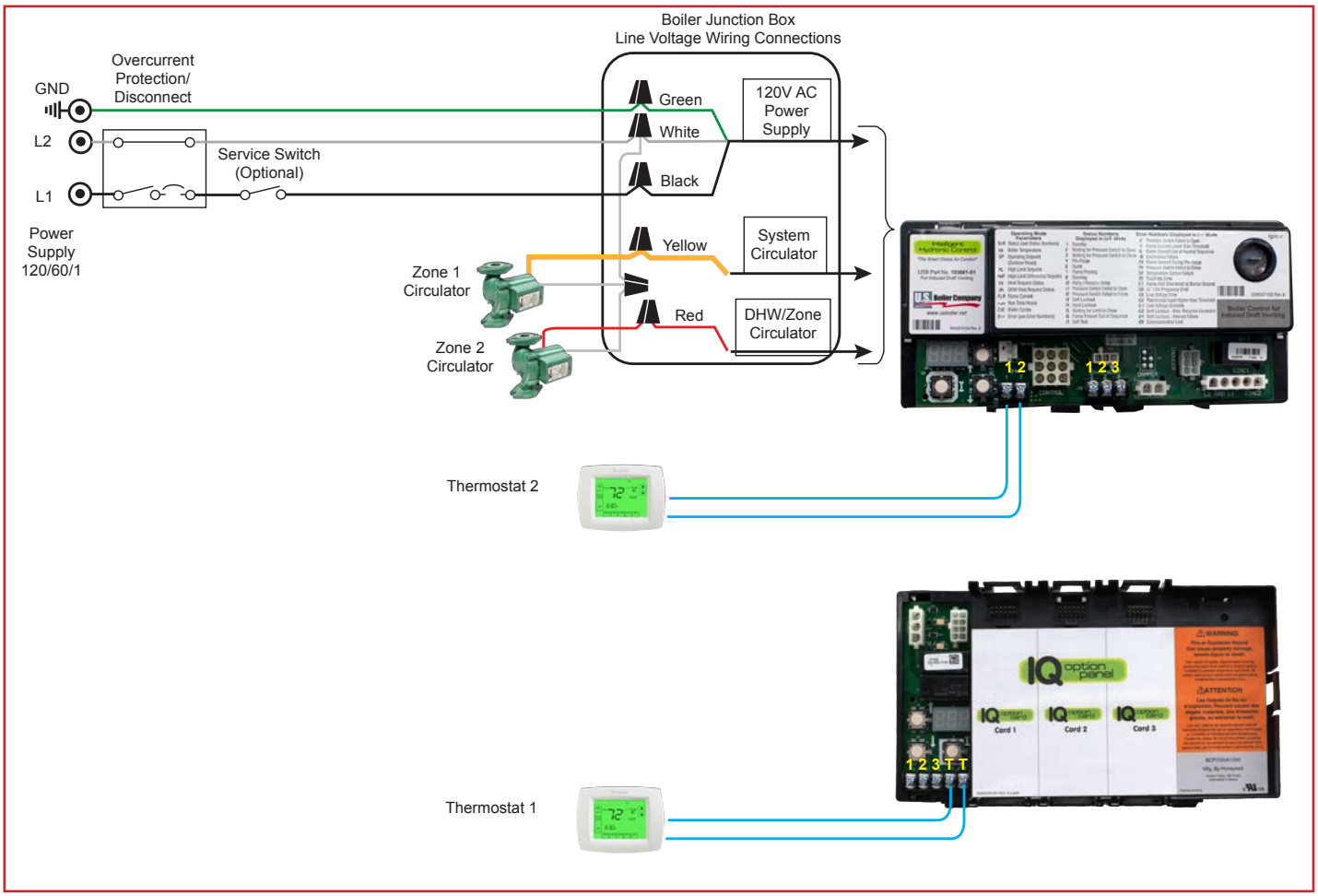


Explanation:

This arrangement can be used with a single heat zone and DHW demand from an Aquastat.

- A thermostat wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI control wired to the IHC "1" & "2" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parmater "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without at time out period.

2.5 Two Zone Heating

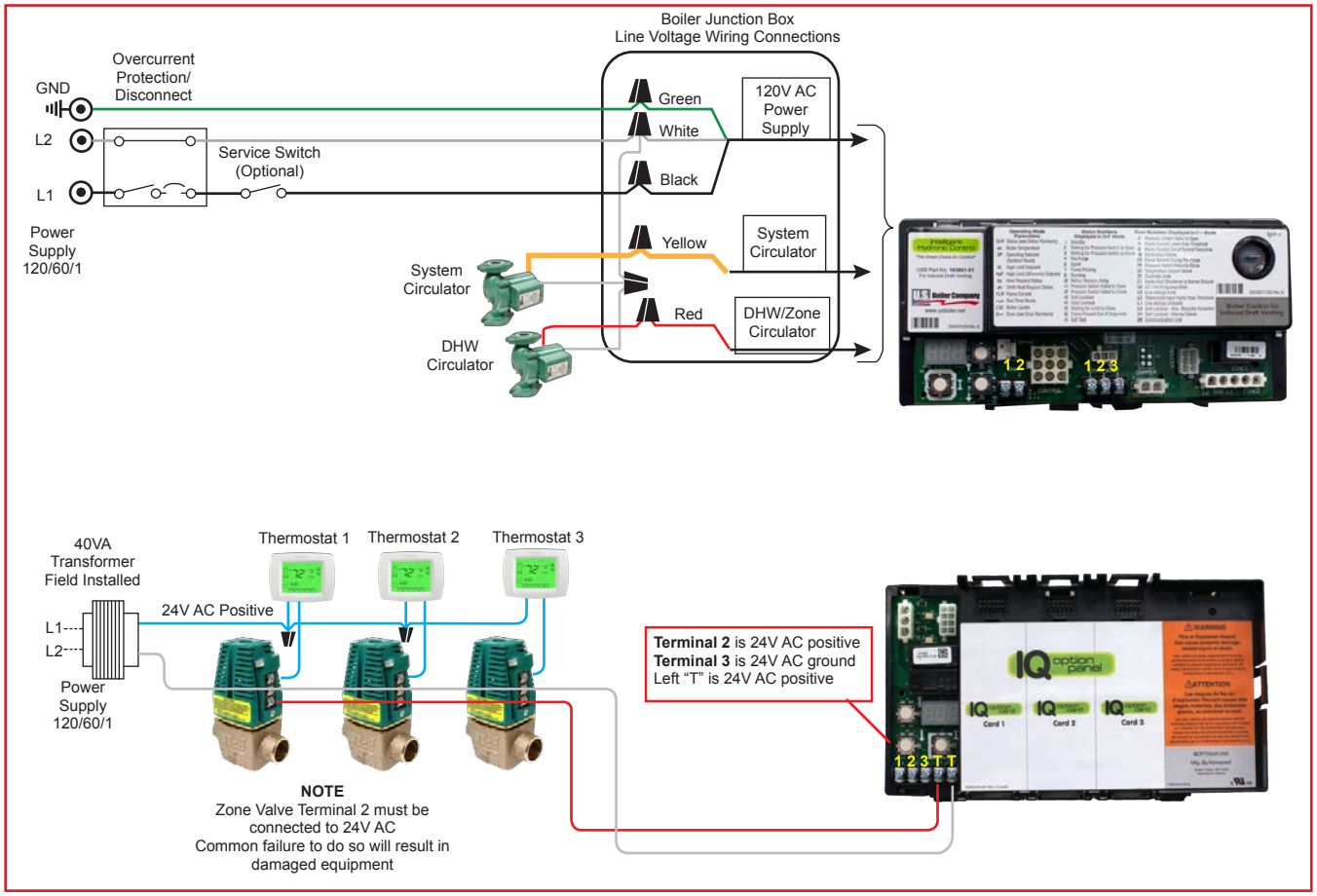


Explanation:

This arrangement allows the boiler to respond to two heating demands through the IHC control and operate both circulators without priority.

- A Zone-1 thermostat wired to the OCP "TT" Terminals provides a Zone-1 heating demand and energizes the yellow system circulator wire. A Zone-2 thermostat wired to the IHC "1" and "2" terminals provides a Zone-2 demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "tt2" and the "Pt" Priority Time parameter is ignored so both circulators can run simultaneously.

2.6 Zone Valve Heating

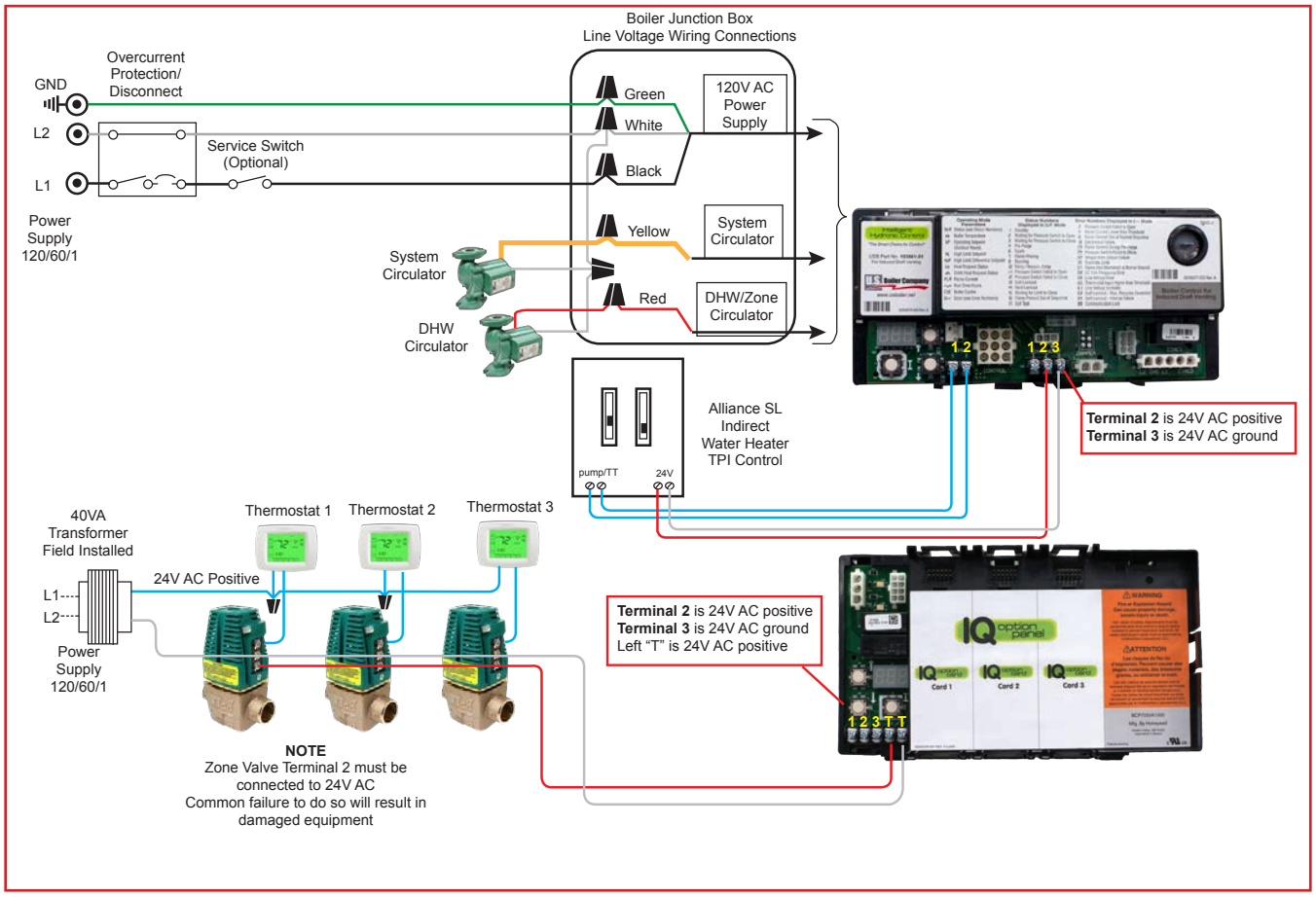


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves.

- The zone valve end switches wired to the OCP "TT" Terminals, provide a heating demand, and energize the yellow system circulator wire.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

2.7 Zone Valve Heating, IWH w/TPI Control, 2 Circulators

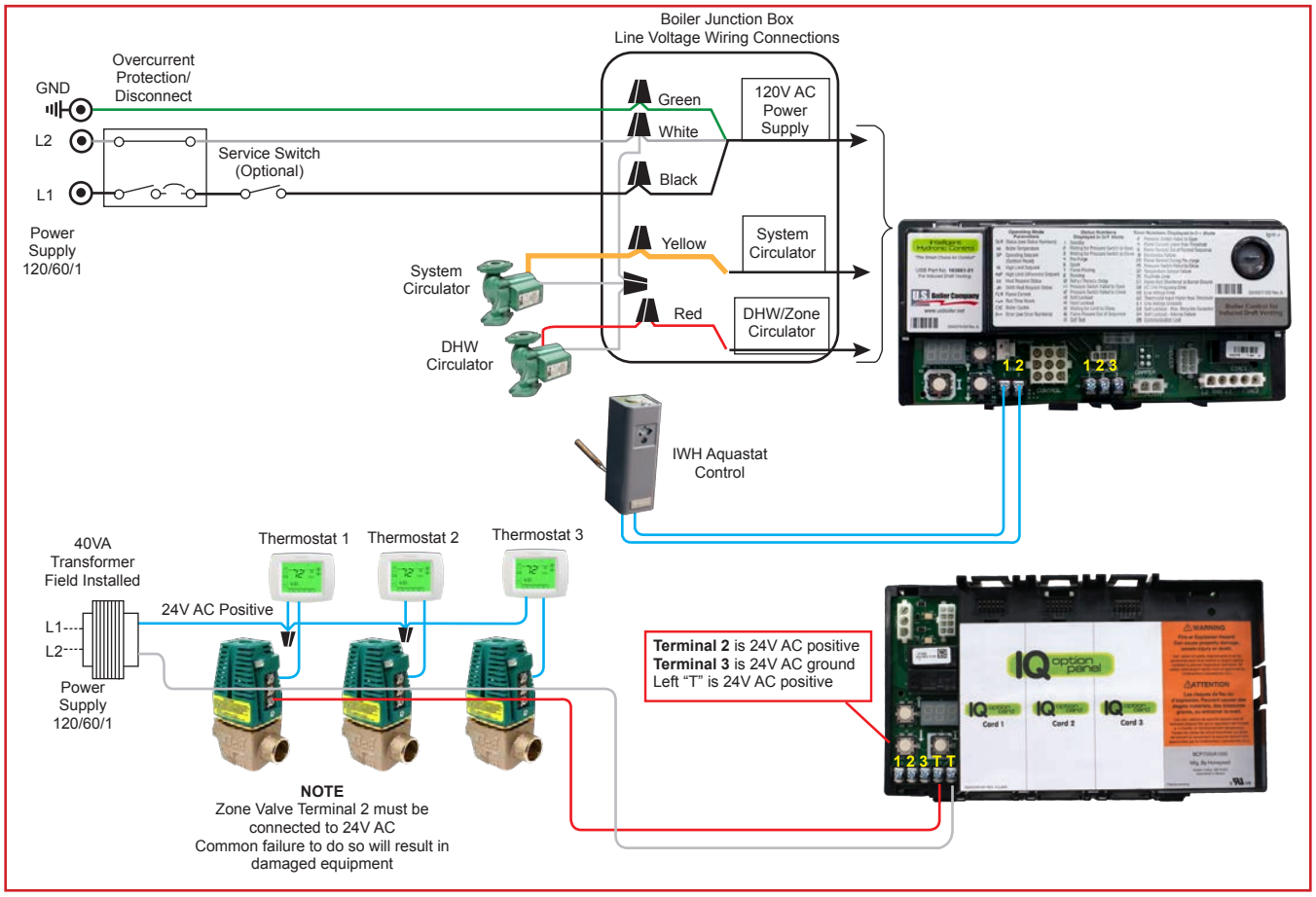


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from a TPI control.

- The zone valve end switches wired to the OCP "TT" Terminals, provide a heating demand, and energize the yellow system circulator wire. The TPI Control wired to the IHC "1" & "2" terminals provide a DHW demand and energize the red DHW/ Zone circulator wire.
- The IHC parameter "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on" it will prioritize the IWH without a time out period
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI control.

2.8 Zone Valve Heating, IWH w/Aquastat Control, 2 Circulators

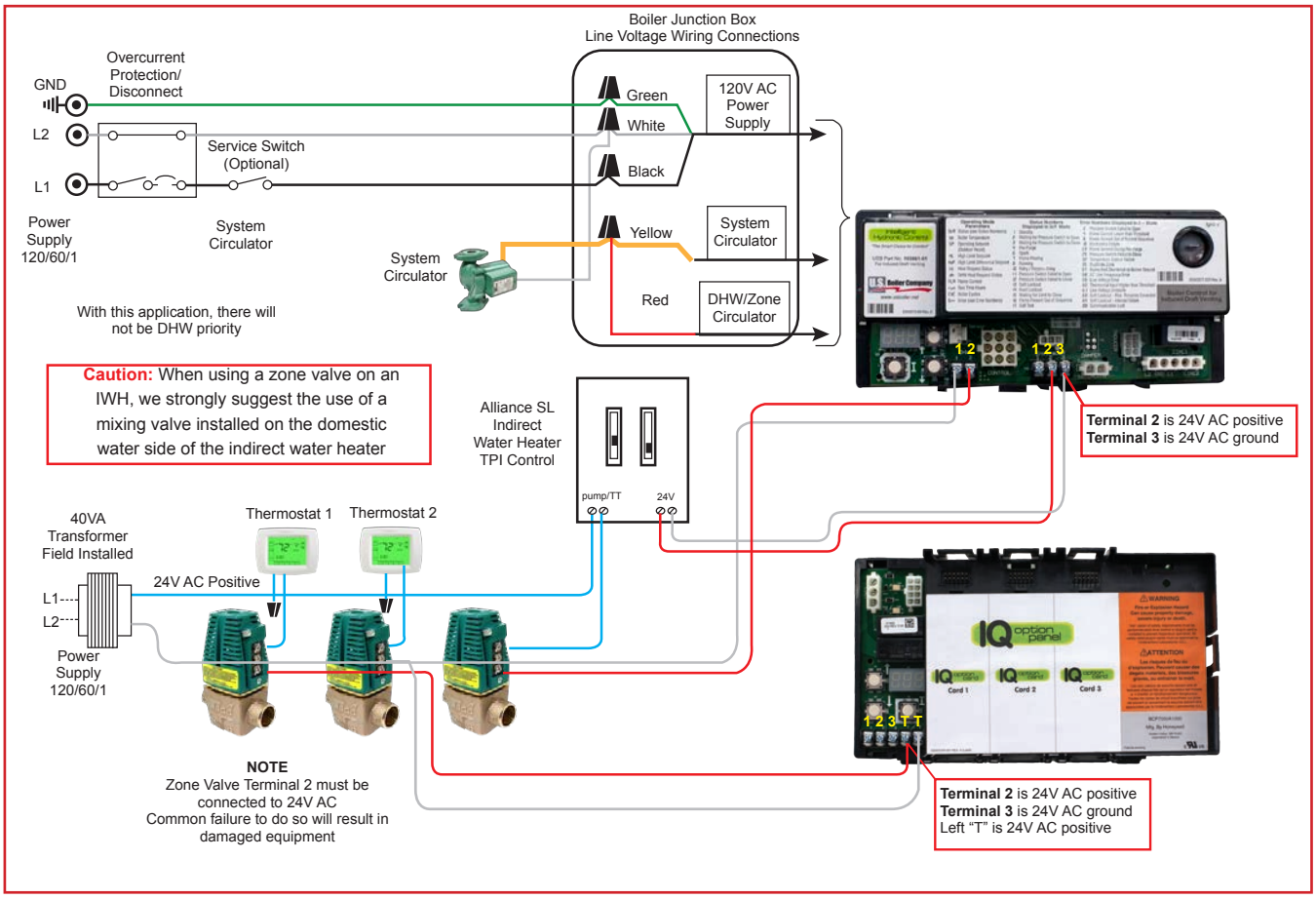


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from an Aquastat control.

- The zone valve end switches wired to the OCP "TT" Terminals, provide a heating demand, and energize the yellow system circulator wire. The IWH Aquastat Control wired to the IHC "1" & "2" terminals provide a DHW demand and energize the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on" it will prioritize the IWH without a time out period
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

2.9 Zone Valve Heating, IWH w/TPI Control, 1 Circulator, No Priority

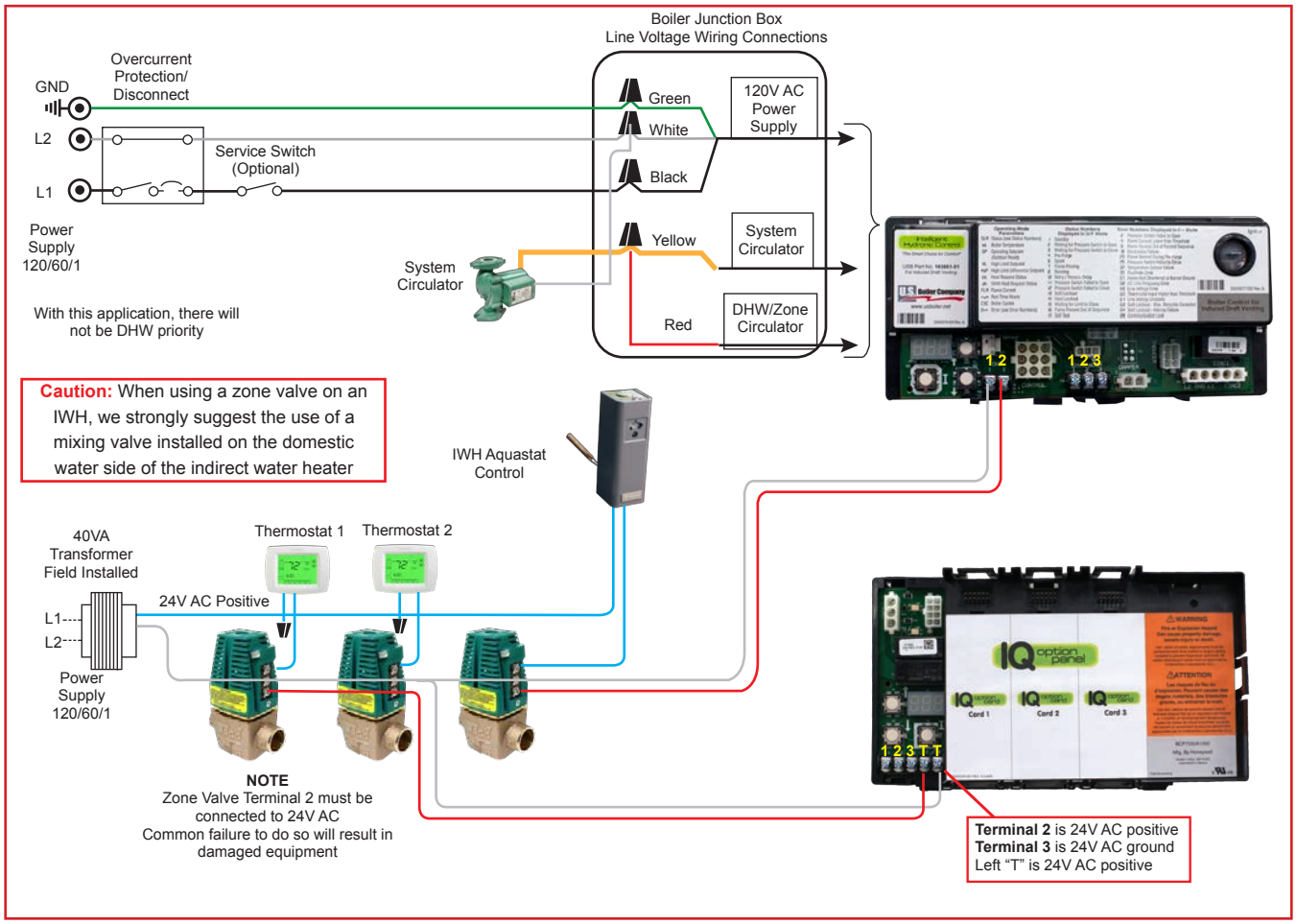


Explanation:

This arrangement allows the use of zone valves for heat and hot water using a single circulator without DHW priority.

- The heating zone valve end switches wired to the OCP "TT" Terminals, provide a heating demand, and energize the yellow system circulator wire. The TPI Control connected zone valve end switch wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". There is no priority in this application due to using only one circulator
- Wiring the DHW zone valve end switch to the IHC will avoid the boiler temperature delayed start used on heat demand
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI control.

2.10 Zone Valve Heating, IWH w/TPI Control, 1 Circulator, No Priority

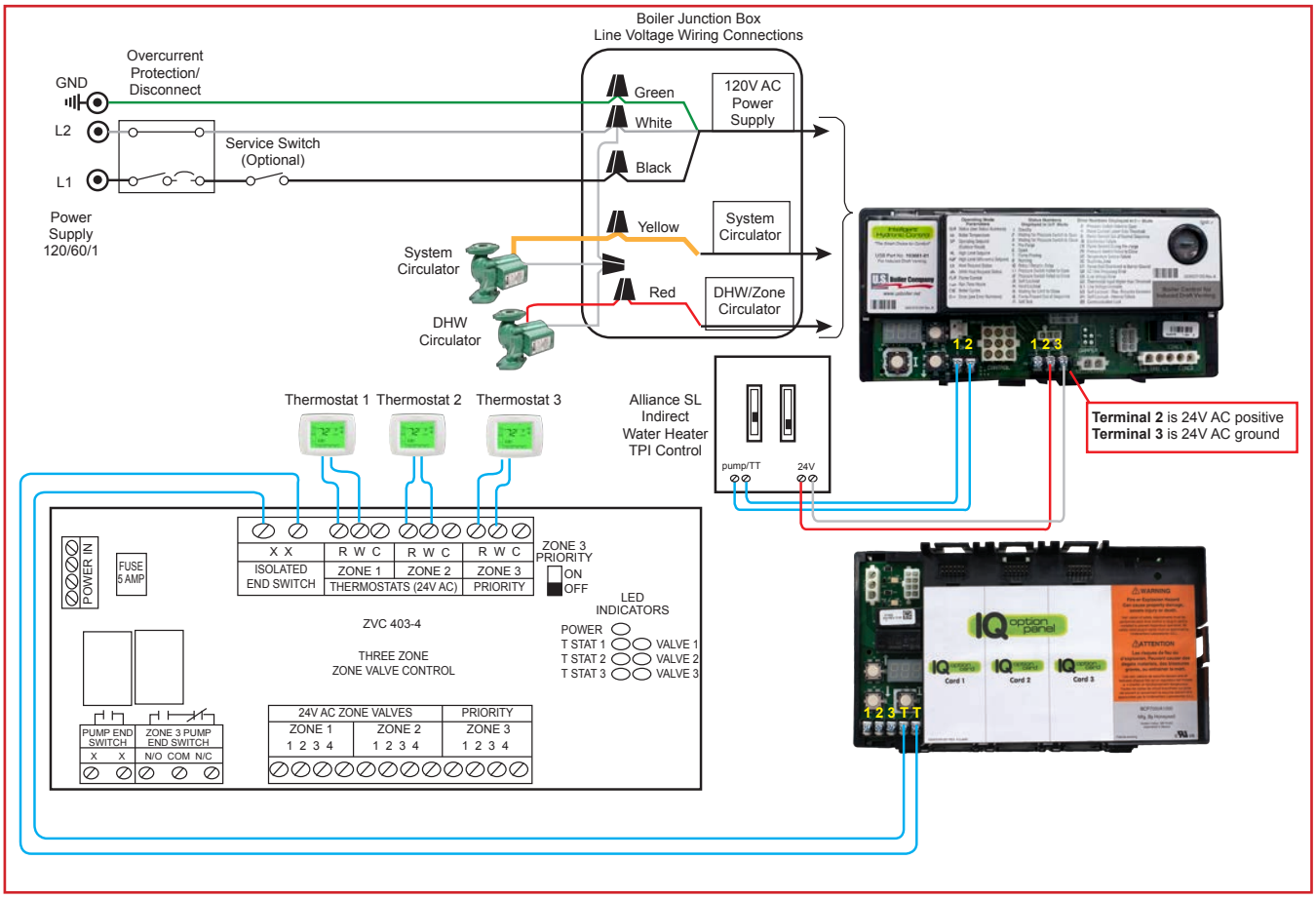


Explanation:

This arrangement allows the use of zone valves for heat and hot water using a single circulator without DHW priority.

- The heating zone valve end switches wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The IWH Aquastat Control connected zone valve end switch wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". There is no priority in this application due to using only one circulator.
- Wiring the DHW zone valve end switch to the IHC will avoid the boiler temperature delayed start used on heat demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and IHC.

2.11 Zone Valve Heating, IWH w/TPI Control, 2 Circulators

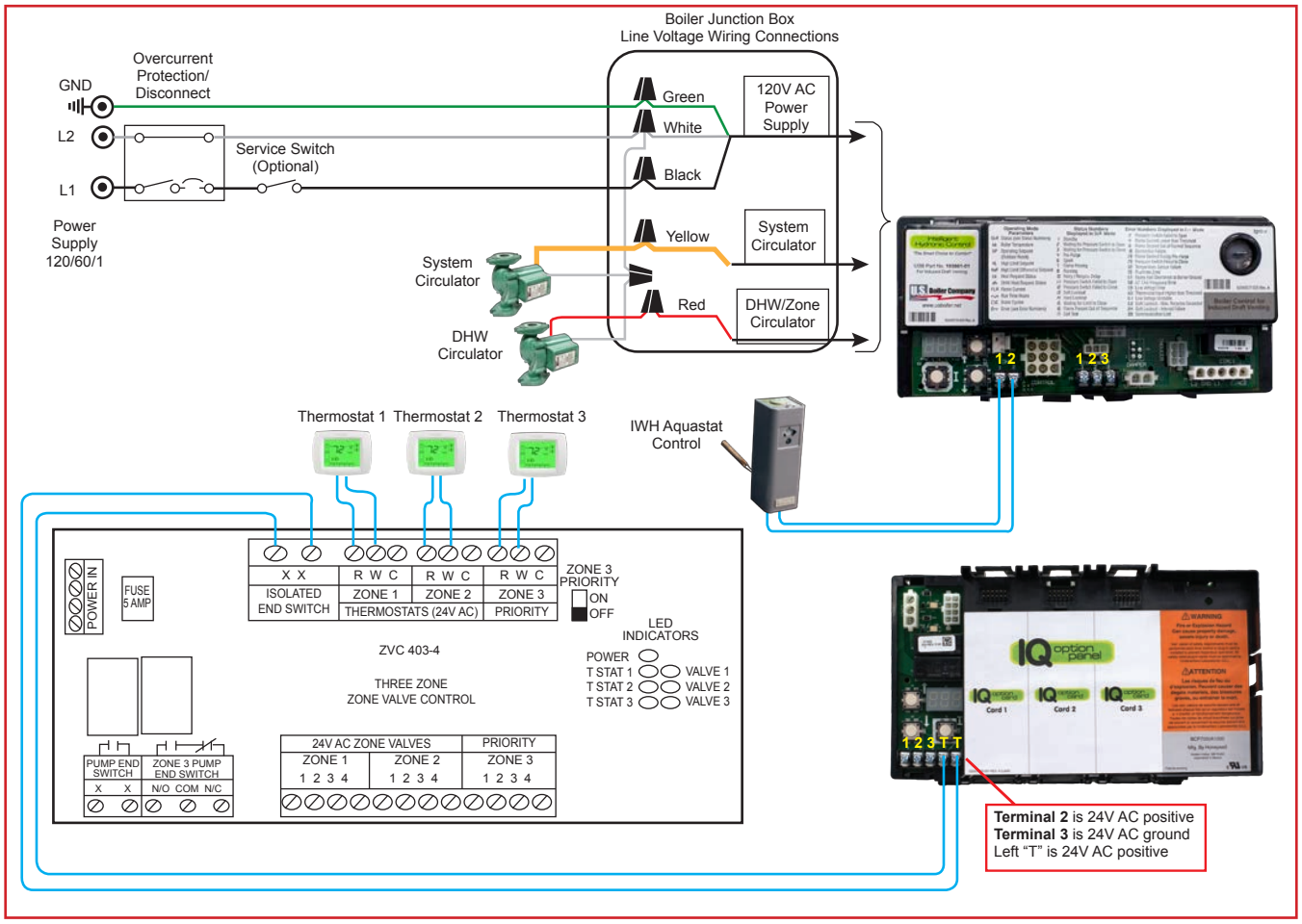


Explanation:

This application uses a zone valve control for heating demands and the DHW demand using at TPI control

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The TPI Control wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/ Zone circulator wire.
- The IHC parameter "dh" must be set to "dh", and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI Control.

2.12 Zone Valve Control Heating, IWH w/Aquastat Control, 2 Circulators

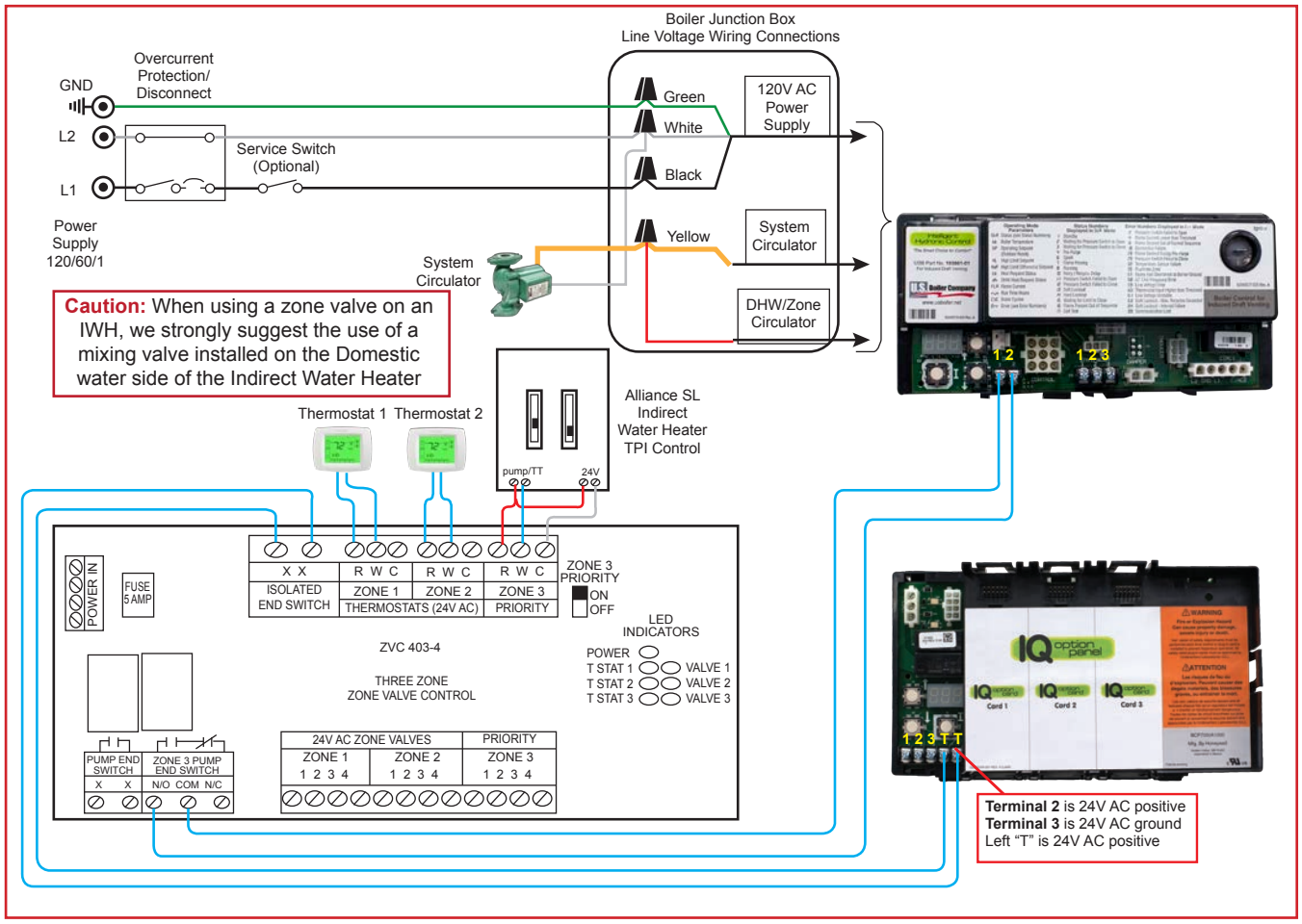


Explanation:

This application uses a zone valve control for heating demands and the DHW demand using an Aquastat control

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The IWH Aquastat Control wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh", and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

2.13 Zone Valve Control Heating, IWH w/TPI Control, 1 Circulator

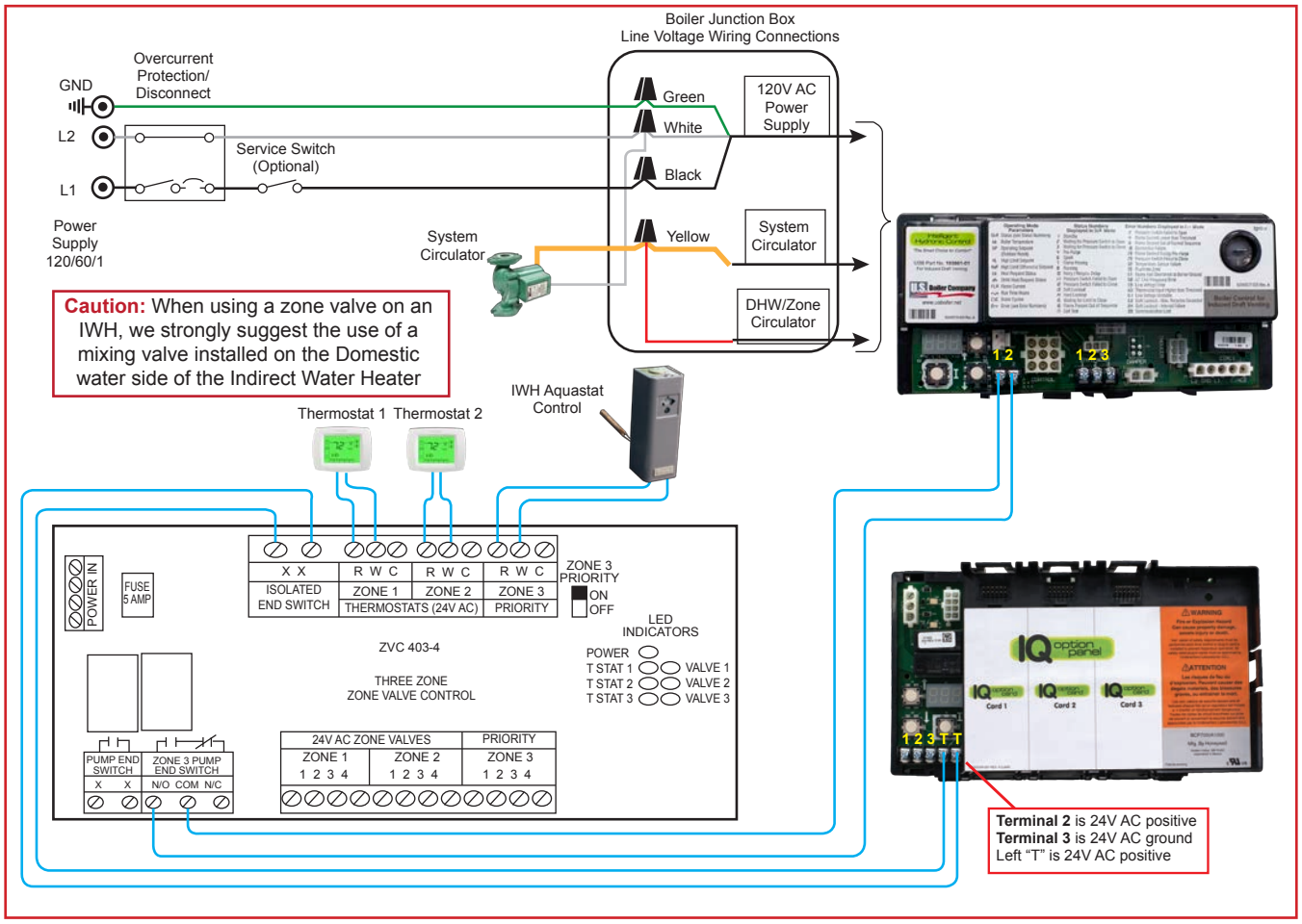


Explanation:

This application uses a zone valve control for heating demands and the DHW demand wired directly to the IHC control utilizing one circulator. Priority is controlled by the zone valve relay control.

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The Zone 3 Pump end switch wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". There is no circulator priority in this application due to using only one circulator.
- Wiring the zone valve control "zone pump 3 end switch" to DHW terminals will avoid the boiler temperature delayed start used on heat demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the TPI Control.

2.14 Zone Valve Control Heating, IWH w/Aquastat Control, 1 Circulator

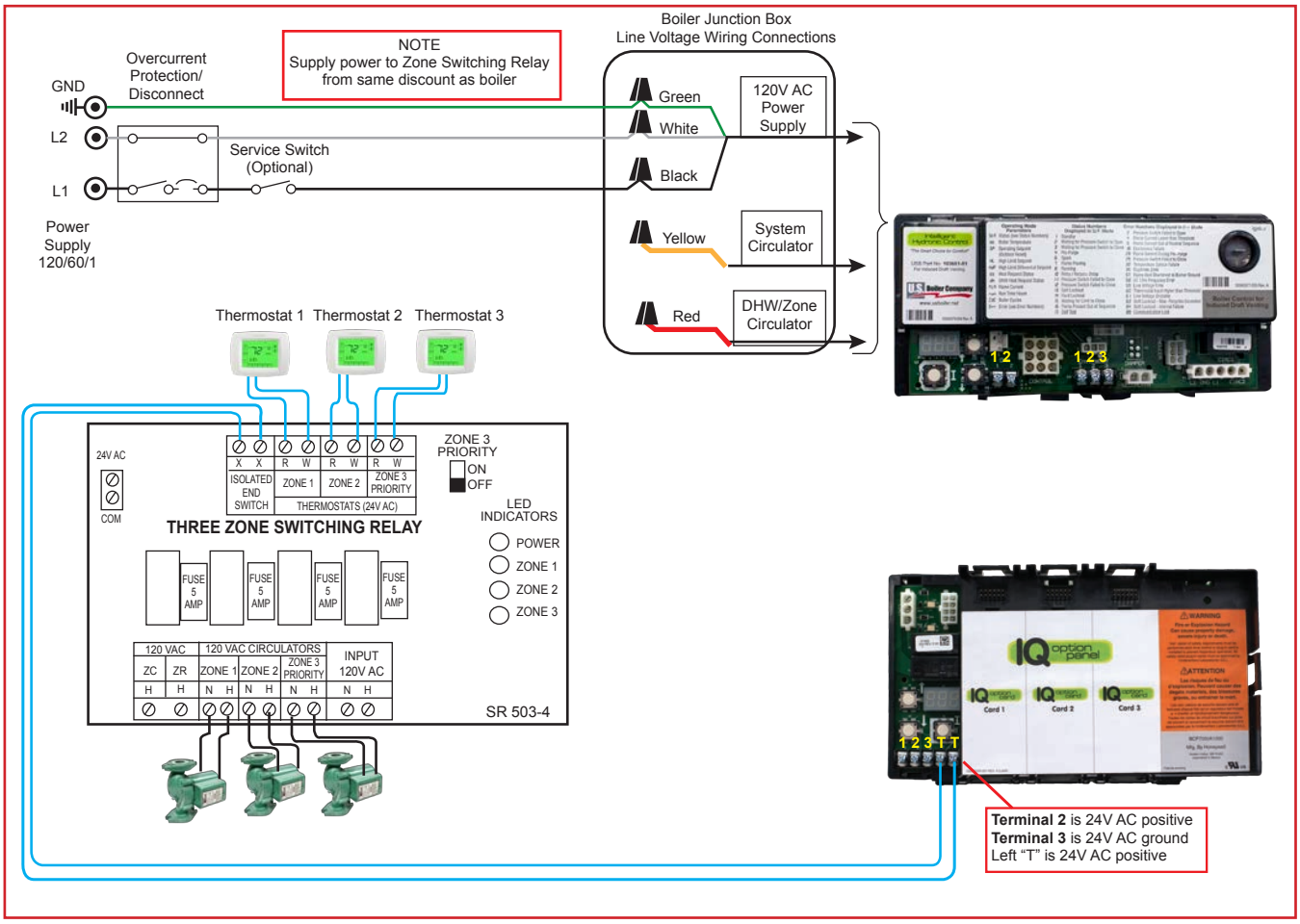


Explanation:

This application uses a zone valve control for heating demands and the DHW demand wired directly to the IHC control utilizing one circulator. Priority is controlled by the zone valve relay control.

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The Zone 3 Pump end switch wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". There is no circulator priority in this application due to using only one circulator.
- Wiring the zone valve control "zone pump 3 end switch" to DHW terminals will avoid the boiler temperature delayed start used on heat demand.

2.15 Zone Switching Relay Heating

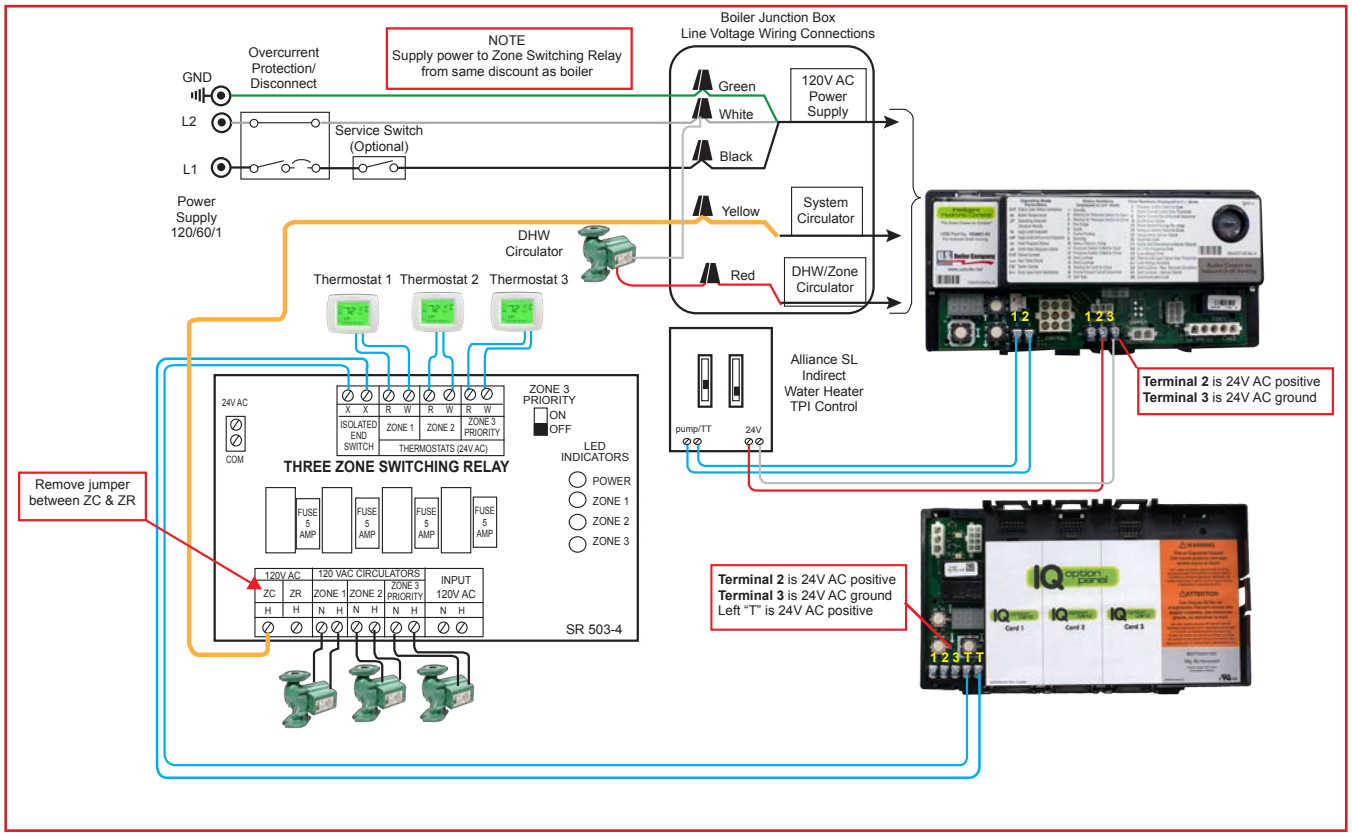


Explanation:

This arrangement allows the boiler to respond to heating demands and control all the circulators from a zone switching relay.

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire.

2.16 Zone Switching Relay Heating, IWH w/TPI Control

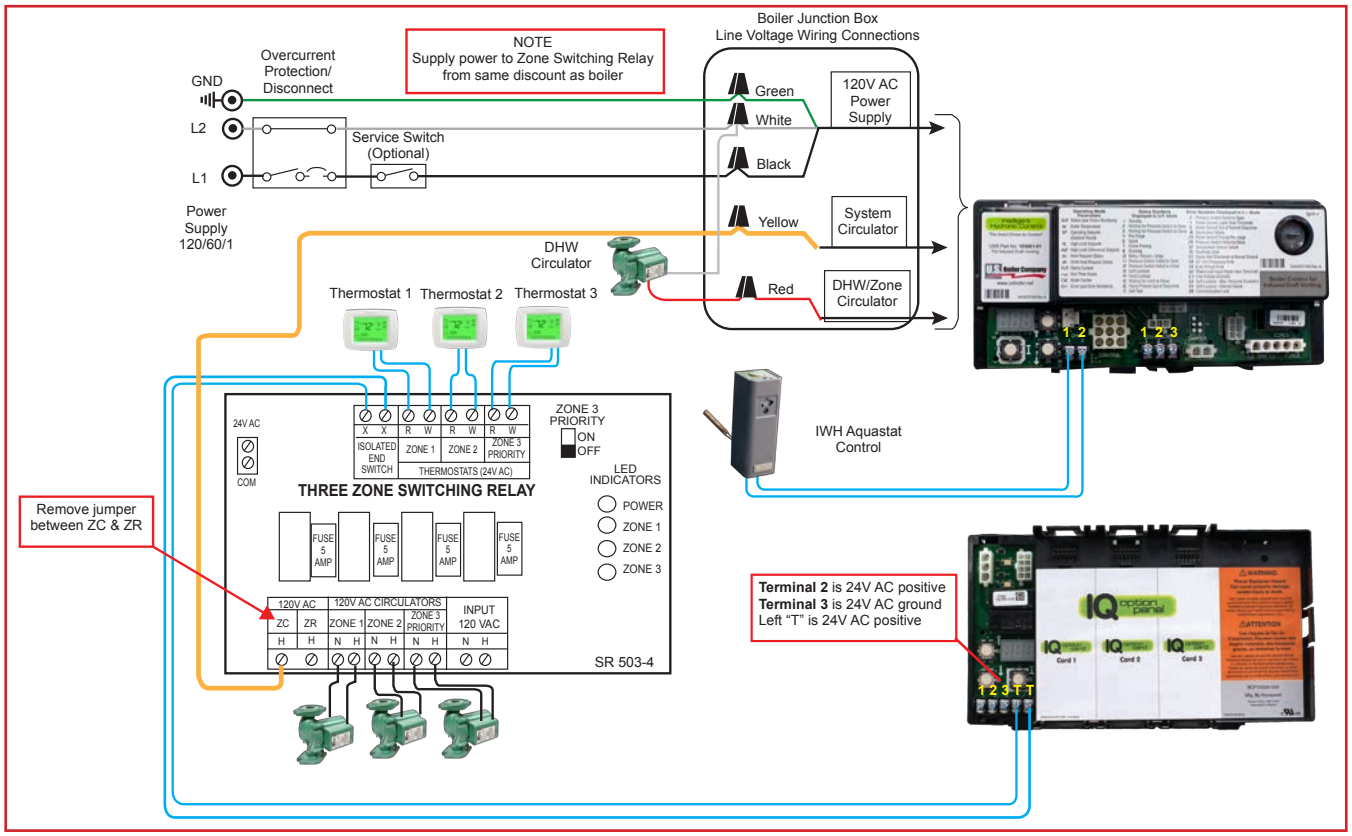


Explanation:

This arrangement allows the boiler to respond to heating demands and control all the circulators from a Zone Switching Relay. IHW takes priority through the IHC control via the yellow system pump wire.

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The TPI Control wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/ Zone circulator wire.
- A heat demand will energize the yellow wire which will supply voltage to the zone pumps via the "ZC" terminals on the zone relay. When the DHW demand activates, the IHC will de-energize the yellow system circulator wire and energize the red DHW circulator. When the DHW demand expires, the IHC will de-energzie the red wire and re-energize the yellow wire, providing there is still a call for heat
- The IHC parameter "dh" must be set to "dh", and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI Control.

2.17 Zone Switching Relay Heating, IWH w/Aquastat Control



Explanation:

This arrangement allows the boiler to respond to heating demands and control all the circulators from a Zone Switching Relay.

- The zone control end switch wired to the OCP "TT" Terminals, provide a heating demand, and energizes the yellow system circulator wire. The IWH Aquastat Control wired to the IHC "1" & "2" terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- A heat demand will energize the yellow wire which will supply voltage to the zone pumps via the "ZC" terminals on the zone relay. When the DHW demand activates, the IHC will de-energize the yellow system circulator wire and energize the red DHW circulator. When the DHW demand expires, the IHC will de-energzie the red wire and re-energize the yellow wire, providing there is still a call for heat
- The IHC parameter "dh" must be set to "dh", and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.

3.0 IQ Gas Boiler Control System, IQ Reset Option Card

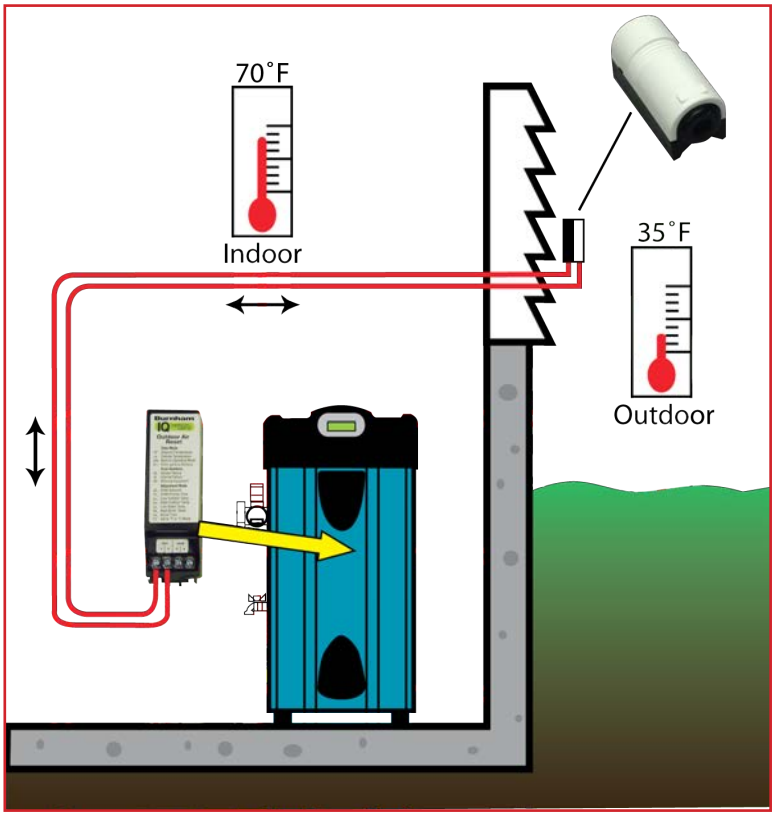
The IQ Outdoor Reset Option Card is an auxiliary control designed specifically for all Burnham products that feature the IQ Control System.

The device than plugs into the IQ Option Panel making it the quickest, simplest way to install the energy savings and improved comfort of a full-featured outdoor reset system in any nearly heating system.

The included weatherproof outdoor temperature sensor is mounted outside the building, and a 2-wire connection is all that's required to connect the Option Card. An additional 2-wire connection to the DHW Aquastat provides a DHW demand.

The IQ Outdoor Reset Option Card contains an impressive list of features normally found only on expensive, stand-alone control systems. A simple click is all it takes to add the these great features:

- Adjustable reset ratio
- Selectable & Adjustable Temperature Boost
- Domestic Hot Water Set Point
- Selectable, Adjustable Domestic Priority
- Selectable, Adjustable Domestic Priority Protection
- Built-In Diagnostics display error codes on LED display
- Can be easily by-passed for service or diagnostics
- Settings and status is displayed on IQ Option Panel
- Adjustments made right on the boiler

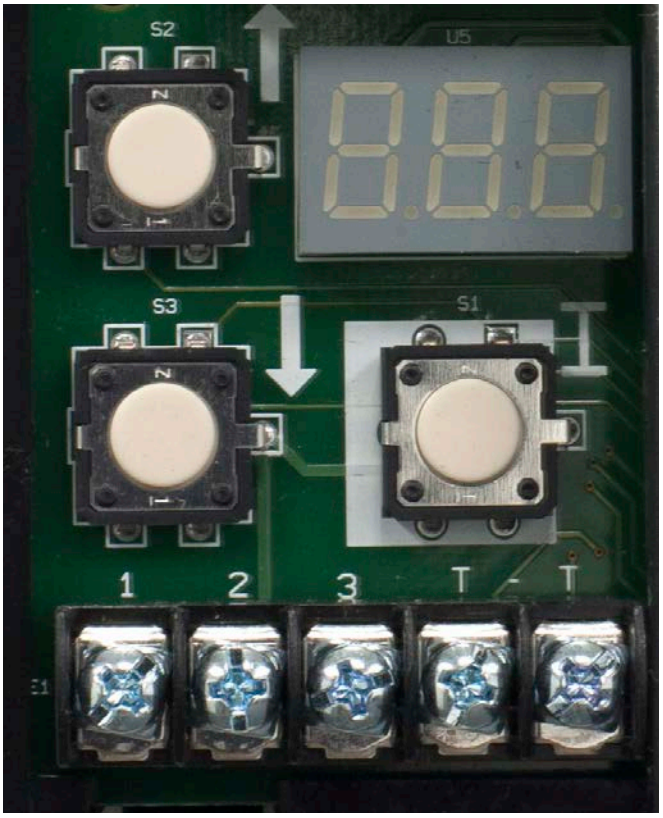


3.0 IQ Gas Boiler Control System, IQ Reset Option Card

IQ Outdoor Reset Option Card Settings / Defaults			
Display	**Description**	**Range**	**Factory Defaults**
View Mode			
SP	Set Point	Set Point of Boiler	180°F
ot	Outdoor Temperature	Actual Temp from Sensor	
Adjustment Mode			
dS	Domestic Set Point	Range: 150°F – 180°F	180°F
Pt	Priority Time	Range: 0-101 Minutes	0 Minutes
tb	Boost Time	Range: 0-30 Minutes	20 Minutes
Lo	Low Outdoor Temp	Range: 50°F – 32°F	0°F
Ho	High Outdoor Temp	Range: 35°F – 100°F	70°F
Lb	Low Boiler Temp	Range: 70°F – 180°F	110°F
Hb	High Boiler Temp	Range: 70°F – 220°F	180°F
Lt	Minimum Boiler Temp	Range: 70°F – 180°F	130°F
F-C	Display in °F or °C	Degrees: °F/°C	Degrees °F
Error Codes			
Err 18	Electronics Failure	Replace Card	
Err 53	Temp Sensor Failure	Replace Sensor	
Err 89	Communication Error	Loose wire between boiler control and option panel or card failure	

The IQ Option Panel features a 3-digit LED, which displays status, settings, and error codes for any IQ Option Cards Installed on the boiler.

- The “I” button is used to toggle between each option card.
- The “UP” and “Down” arrows are used to adjust settings when the IQ Option Panel is in the Adjust Mode.
- When all 3 buttons are held down for 3 seconds, the Option Panel will enter the Adjust Mode and an underscore will be displayed.
- If no keys are pressed, after 5 minutes the Option Panel will automatically return to the View Mode.



Optional Control Panel – ODR Card Adjustable Mode

The optional Control Panel (OCP) has three usable slots for plug in cards. Cards can be plugged in in any order. If less than three cards are used they can be in any slot, they do not have to be in any specific order. Once the card is placed in a slot it cannot be moved to another slot without using the "Lrn" function on the OCP. If the card is moved you will receive an error code but no damage will occur to the card.

The control has three buttons used to view error codes and access the cards to view or change the parameters. If using the Outdoor Reset (ODR) card you may want to change some of the outdoor reset parameters for a more efficient operation.

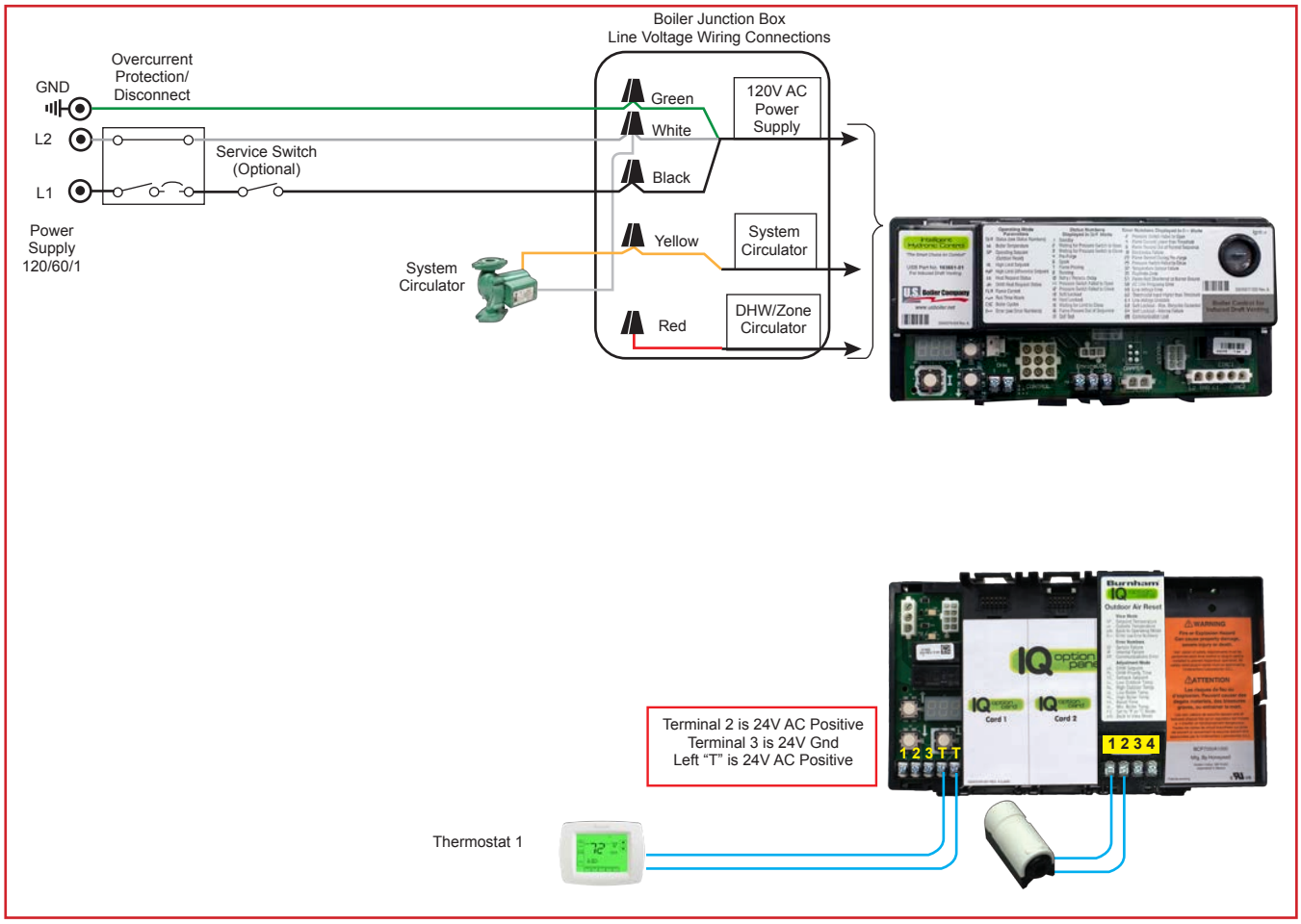
If there is an IWH on the jobsite it will need to be wired to the ODR card to override the ODR feature on a call for DHW. The card will prioritize the DHW demand and you may be required or choose to change the Priority Time (Pt) the IWH will run before the heating circulators will be re-energized. A required priority time change would be if you have two circulators, one for heating and the other for DHW. The "Pt" factory default is "0" minutes, left at "0" will start both pumps wired to the boiler on a DHW demand. Starting just the DHW circulator on a DHW demand you would change the "Pt" setting from "0" to any value more than "0". A normal range would be 20 minutes or more depending on tank size and demand.

The ODR card is located in the #2 slot on the OCP pictured above. To access the card follow the directions below;

1. Press and release the "I" button until "C2" appears on the display.
2. Press one of the Arrow buttons
3. Press and hold all three buttons at the same time until an underscore appears on the display where the bottom of the third digit would appear.
4. Press the "I" button until you see the Priority Time (Pt) parameter.
5. Press the "up arrow" button to set to desired number of minutes.
6. Press the "I" button to advance to the next parameter, this also saves the setting
7. Continue to press the "I" button until "bAc" is displayed
8. Press an arrow key to leave the parameter adjust mode.

You can stop at any parameter and make changes if needed.

3.1 Single Zone Heating

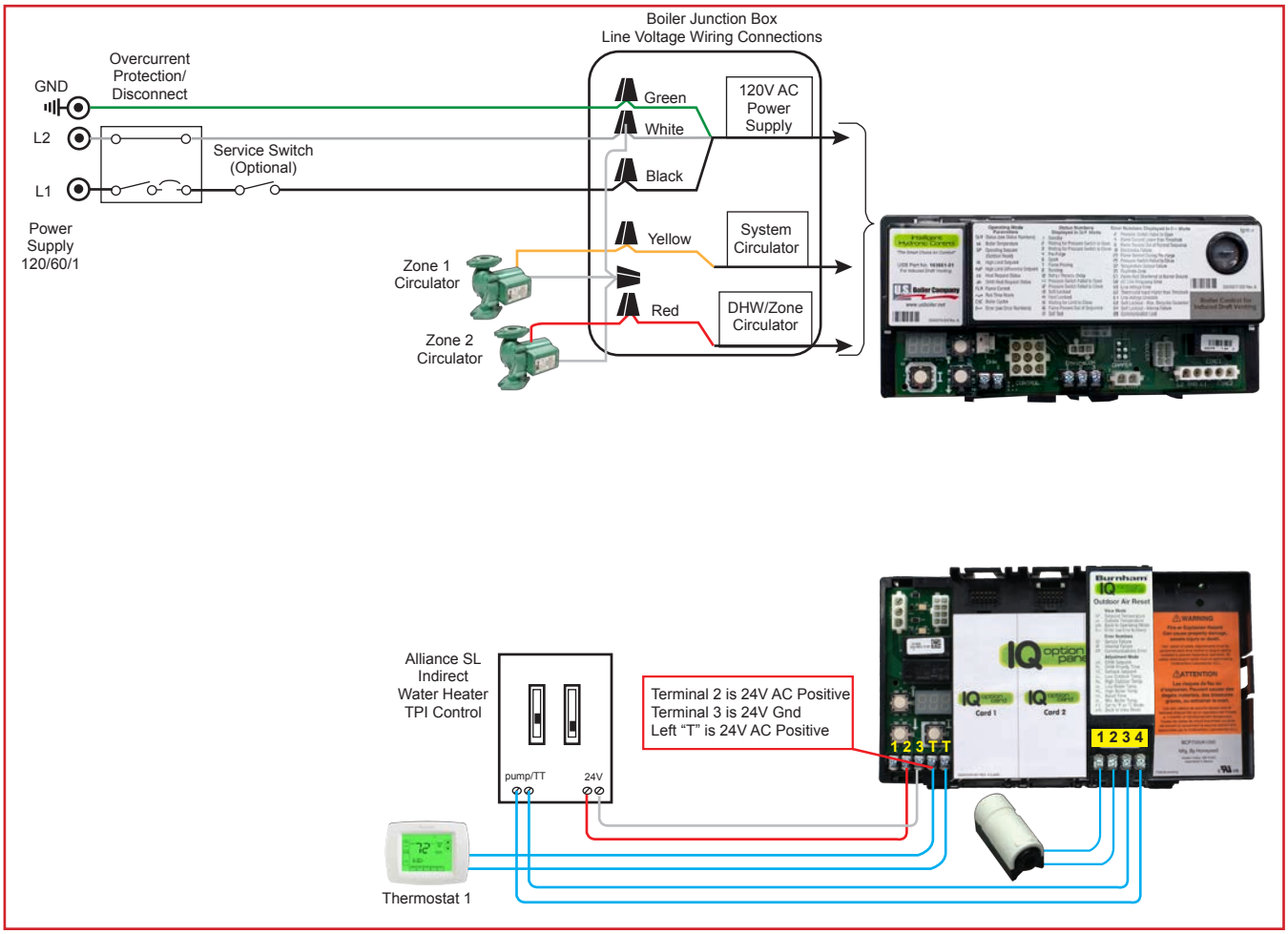


Explanation:

This arrangement can be used when an IQ Gas Boiler is connected to a singe zone heating system

- A thermostat wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature.

3.2 Single Zone Heating, IWH w/TPI Control

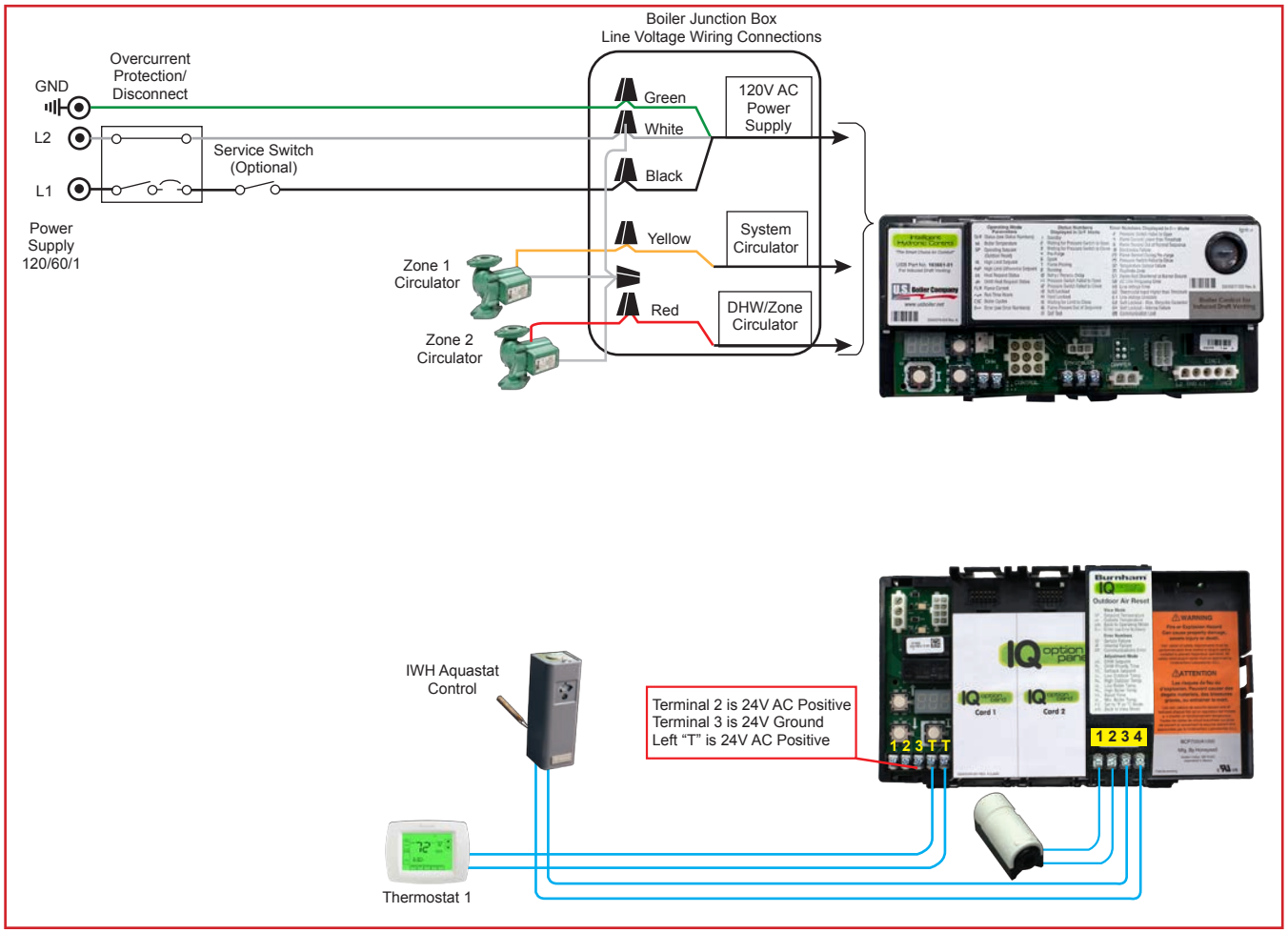


Explanation:

This arrangement can be used when there is a single heat zone and a DHW demand.

- A thermostat wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh"
- Priority time (Pt) and DHW Setpoint can be set on the IQ Outdoor Reset Option Card.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI Control.

3.3 Single Zone Heating, IWH w/Aquastat Control

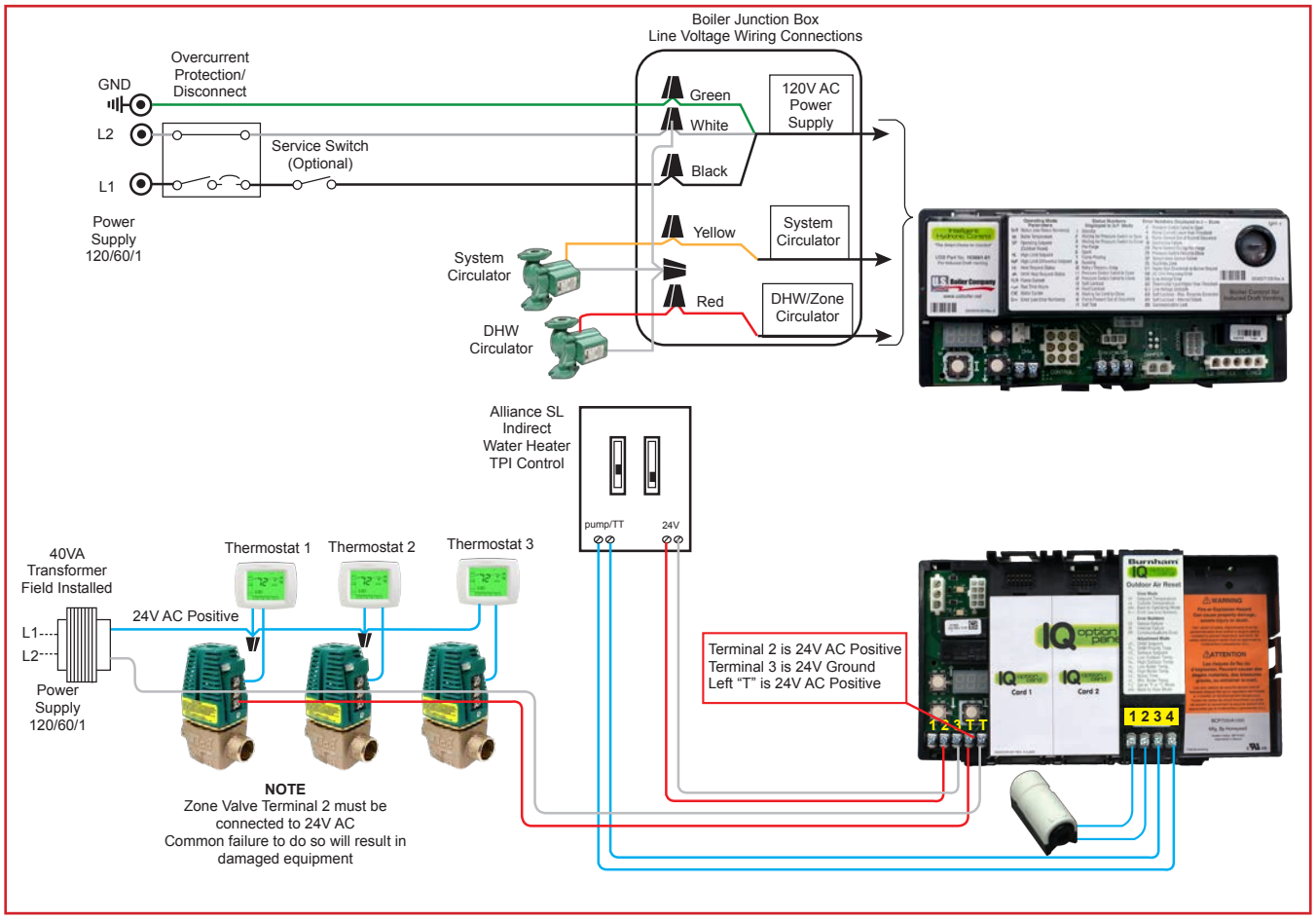


Explanation:

This arrangement can be used when there is a single heat zone and a DHW demand.

- A thermostat wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh"
- Priority time (Pt) on the ODR card must be set > "0". See instructions on page 24.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.

3.4 Zone Valves Heating, IWH w/TPI Control, 2 Circulators

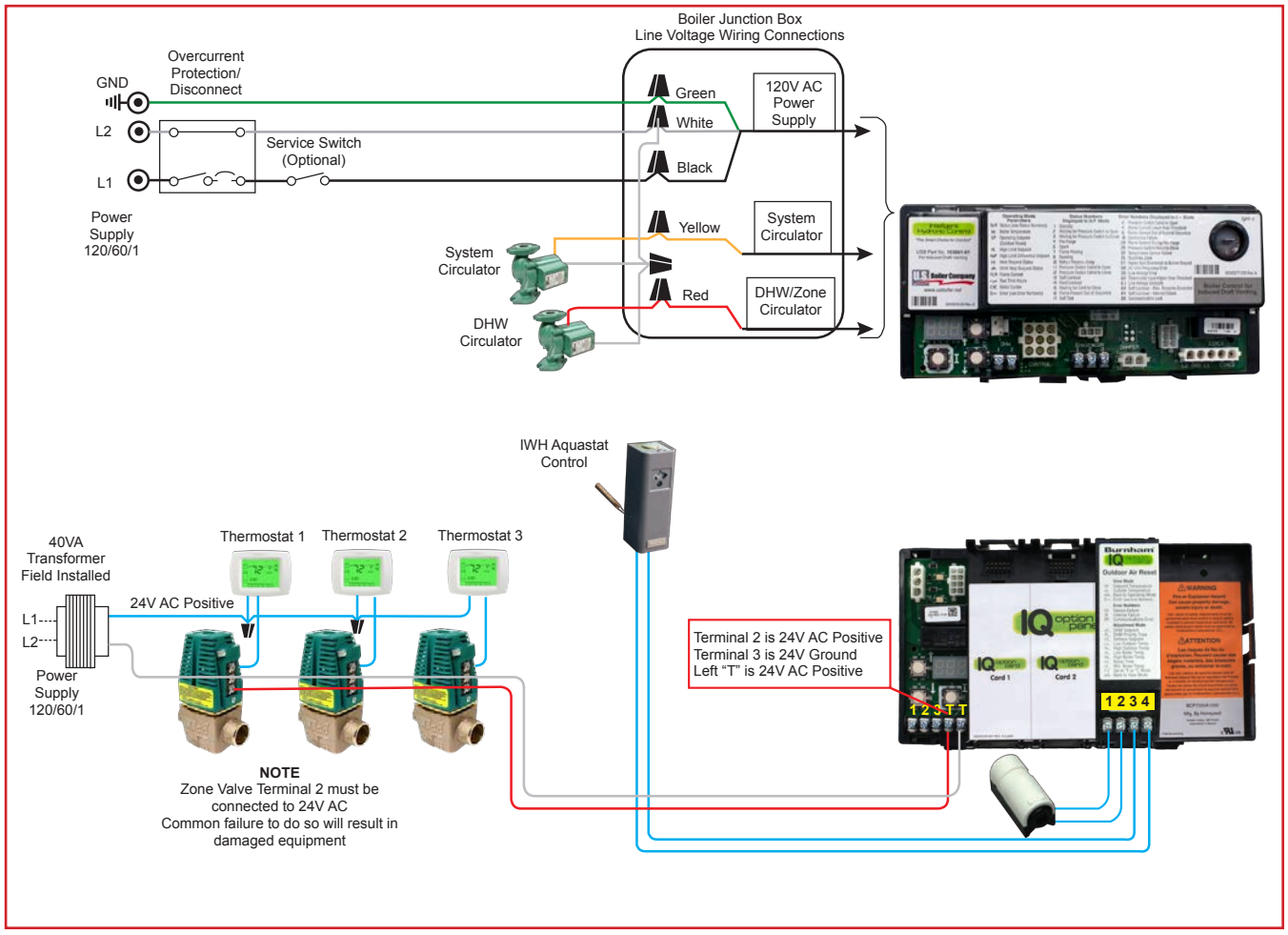


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from a TPI control.

- The zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh"
- Priority time (Pt) on the ODR card must be set > "0". See instructions on page 24.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI Control.

3.5 Zone Valves Heating, IWH w/Aquastat Control, 2 Circulators

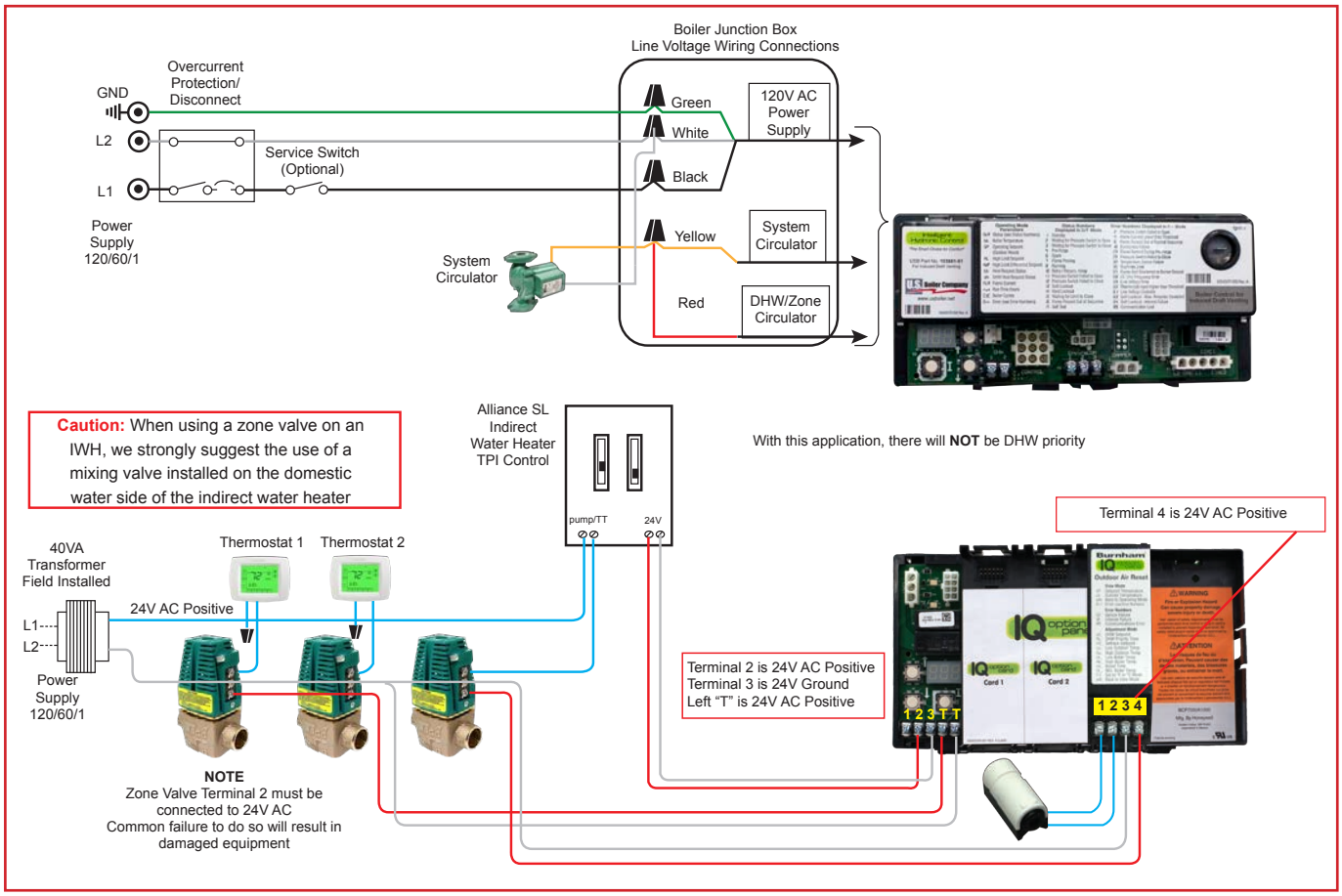


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from an Aquastat control.

- The zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control connected zone valve end switch wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh"
- Priority time (Pt) on the ODR card must be set > "0". See instructions on page 24.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

3.6 Zone Valves Heating, IWH w/TPI Control, 1 Circulator, No Priority

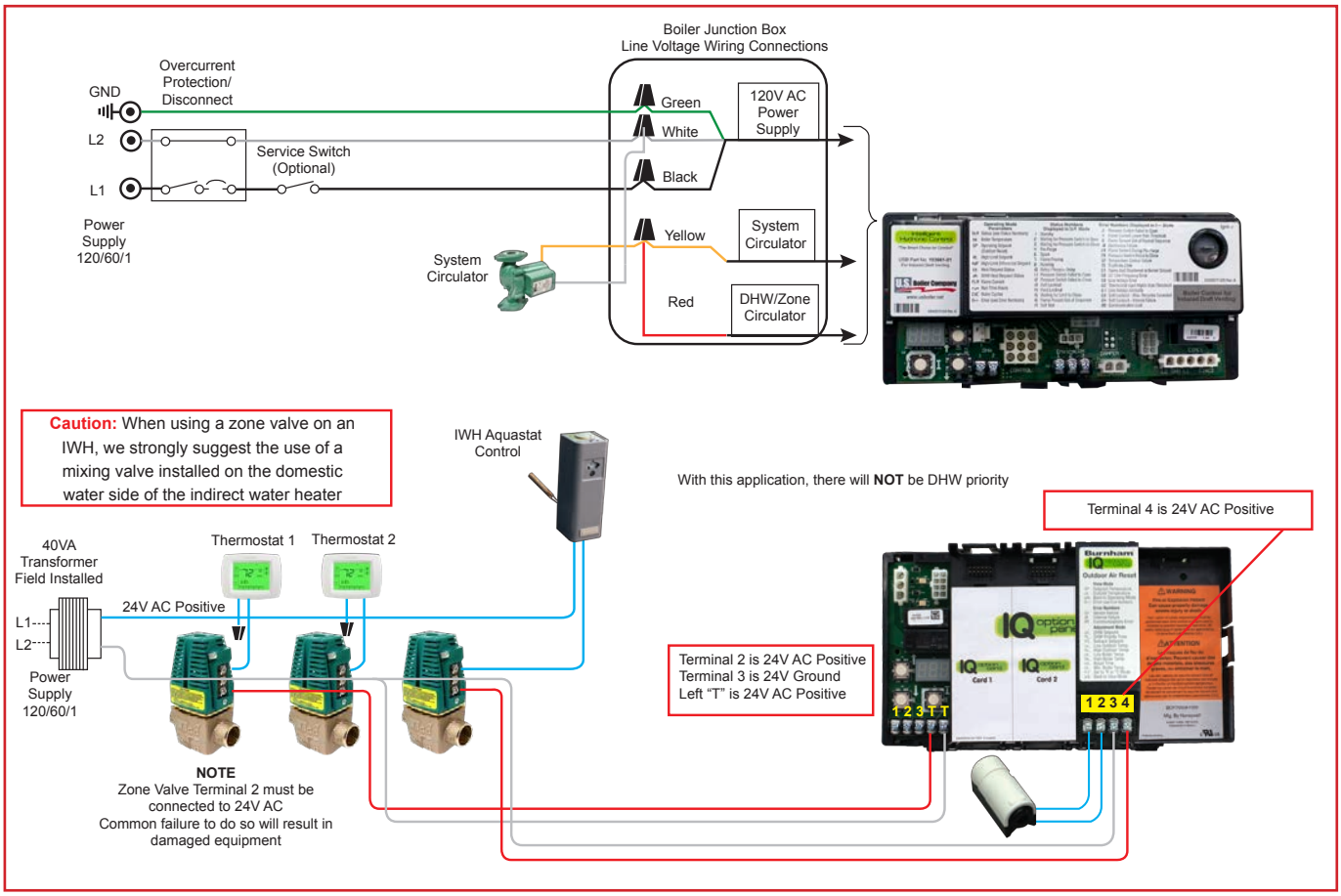


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from a TPI control.

- The zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI Control connected zone valve end switch wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". There is no priority in this application due to using only one circulator.
- Wiring the zone valve end switches to DHW terminals will avoid the boiler temperature delayed start used on heat demand and provides a DHW setpoint.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and the TPI control.

3.7 Zone Valves Heating, IWH w/Aquastat Control, 1 Circulator, No Priority

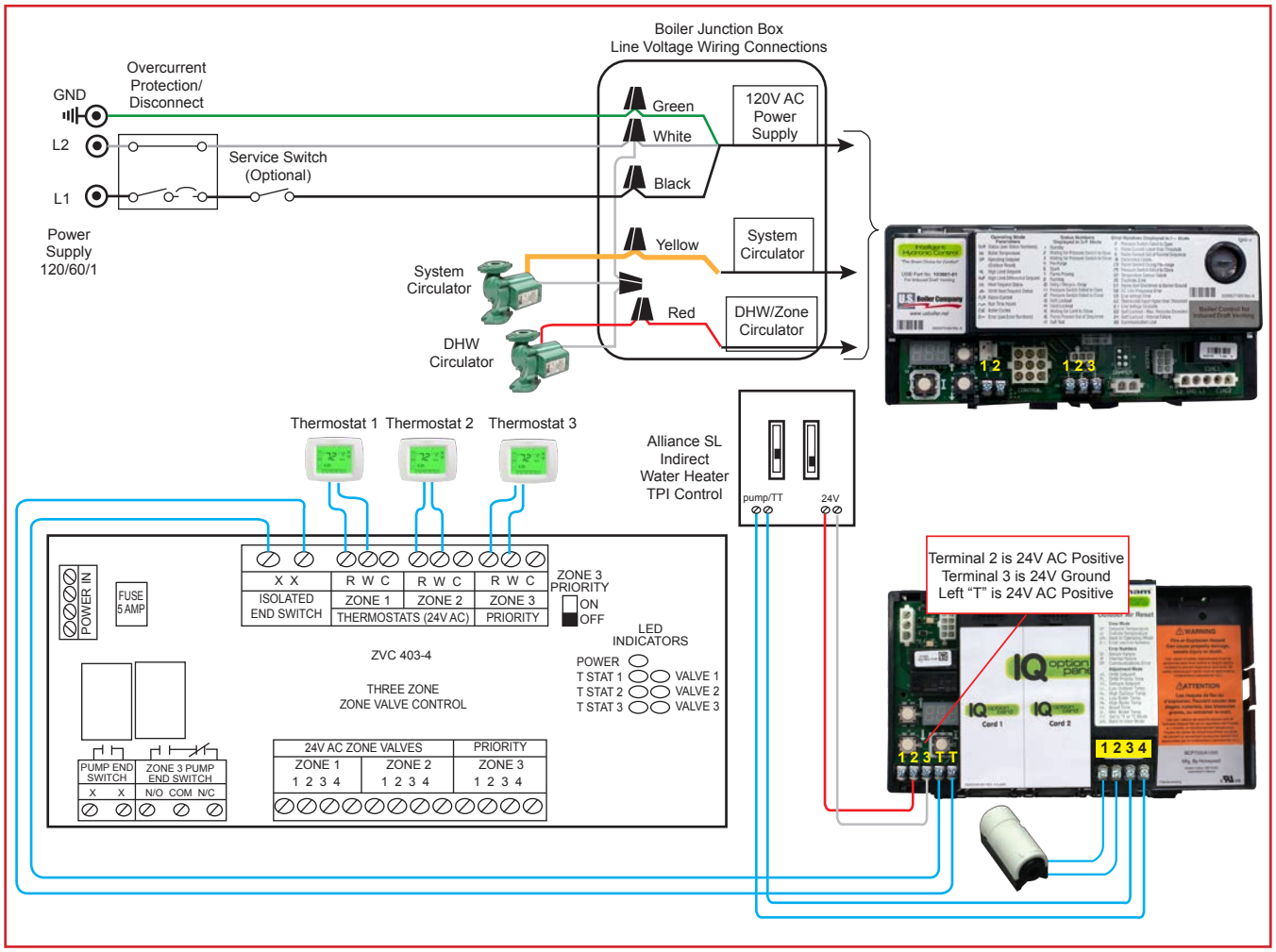

Boiler Junction Box
Line Voltage Wiring Connections
Overcurrent Protection/ Disconnect
GND
L2
L1
Service Switch (Optional)
Power Supply 120/60/1
Green
White
Black
120V AC Power Supply
Yellow
System Circulator
Red
DHW/Zone Circulator
System Circulator
Caution: When using a zone valve on an IWH, we strongly suggest the use of a mixing valve installed on the domestic water side of the indirect water heater
IWH Aquastat Control
With this application, there will NOT be DHW priority
Terminal 4 is 24V AC Positive
40VA Transformer Field Installed
Thermostat 1
Thermostat 2
24V AC Positive
L1
L2
Power Supply 120/60/1
Terminal 2 is 24V AC Positive
Terminal 3 is 24V Ground
Left "T" is 24V AC Positive
1 2 3 T T
1 2 3 4
NOTE
Zone Valve Terminal 2 must be connected to 24V AC
Common failure to do so will result in damaged equipment

Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from an Aquastat control.

- The heating zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control connected zone valve end switch wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". There is no priority in this application due to using only one circulator.
- Wiring the zone valve end switches to DHW terminals will avoid the boiler temperature delayed start used on heat demand and provides a DHW setpoint.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

3.8 Zone Valve Control Heating, IWH w/TPI Control, 2 Circulators

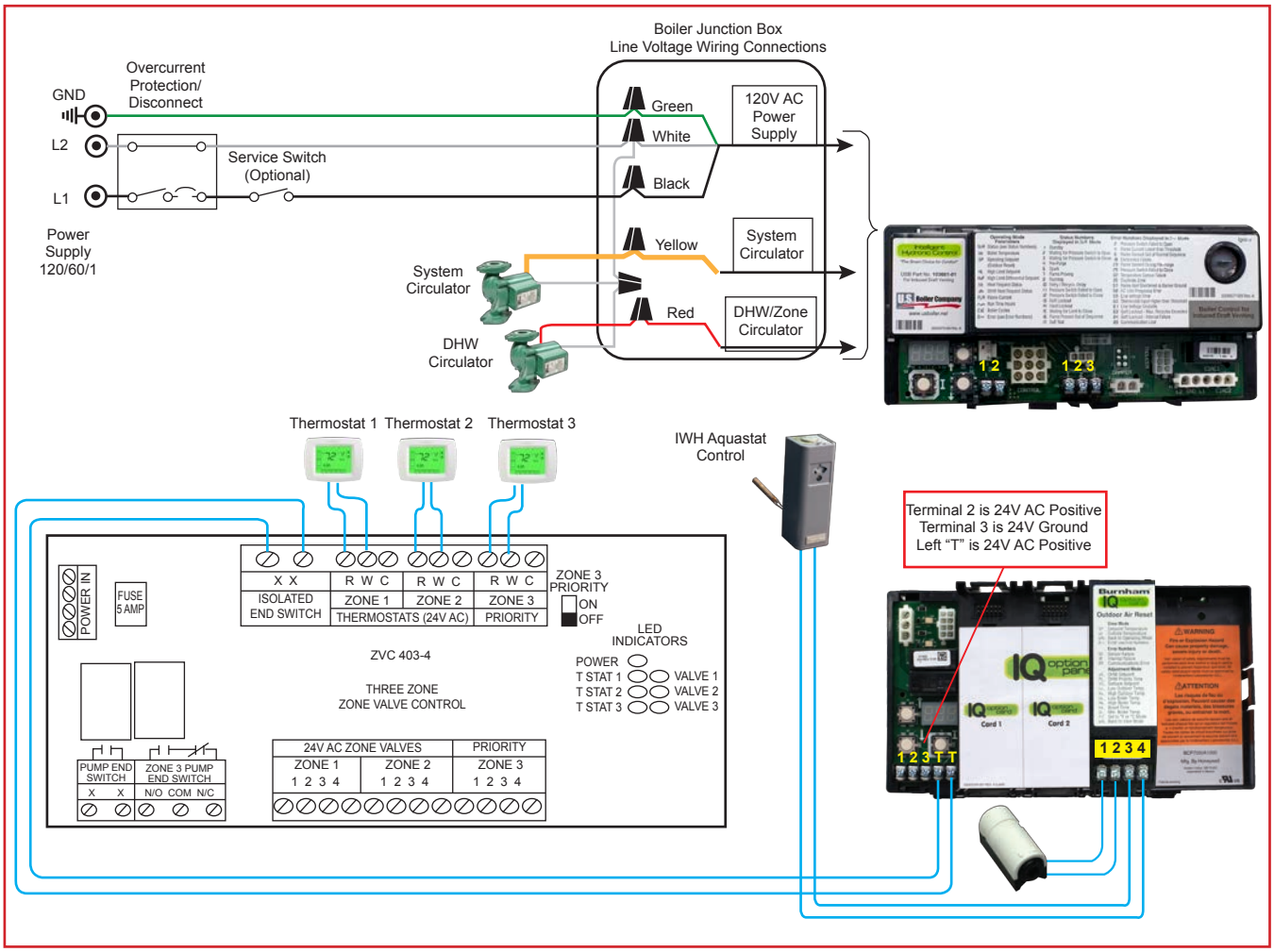


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing a zone valve control and a DHW demand from a TPI control.

- The heating zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh".
- Priority time (Pt) on the ODR card must be set > "0". See instructions on page 24.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

3.9 Zone Valve Control Heating, IWH Aquastat Control, 2 Circulators

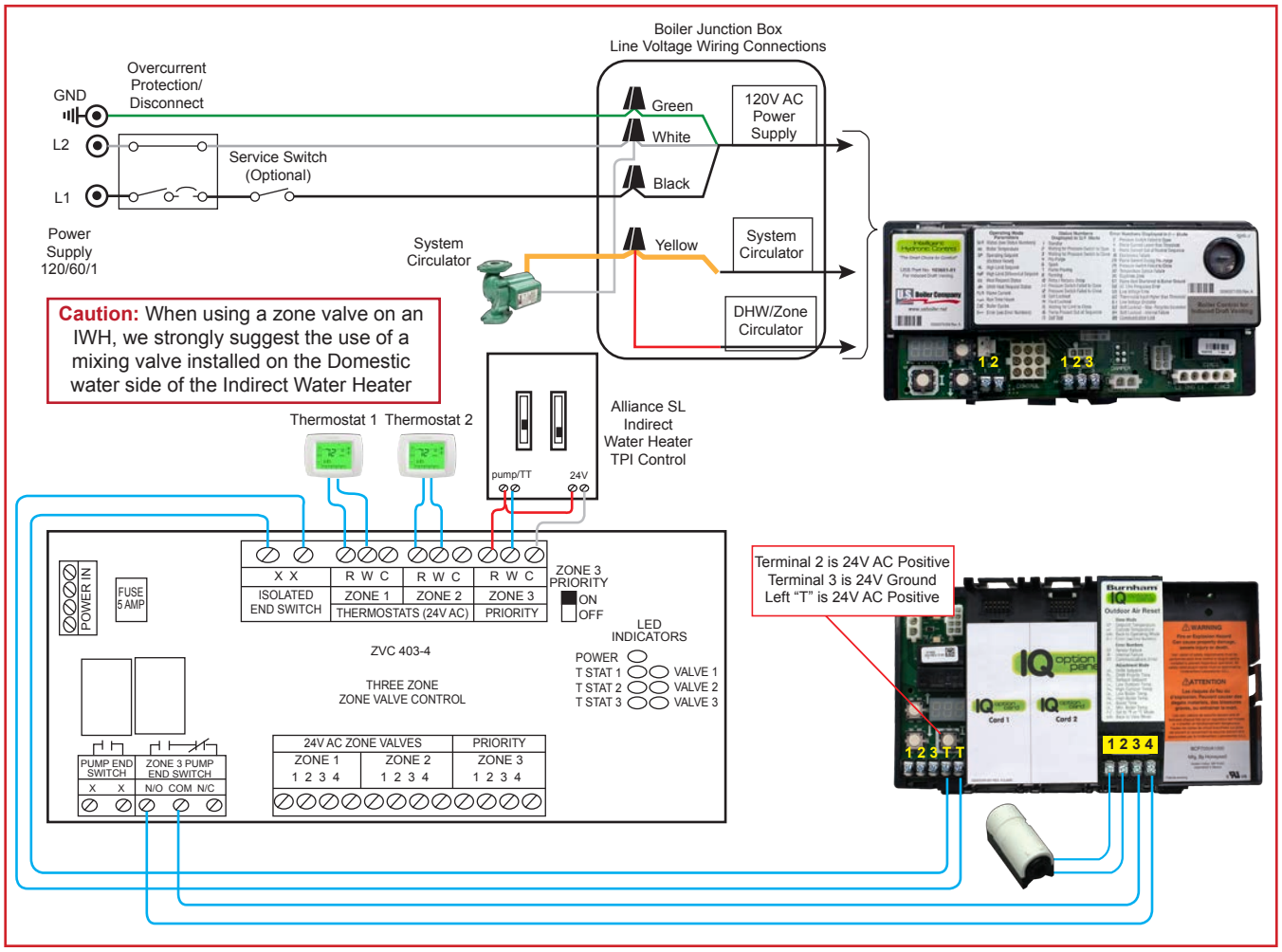


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing a zone valve control and a DHW demand from an Aquastat control.

- The heating zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh".
- Priority time (Pt) on the ODR card must be set > "0". See instructions on page 24.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.

3.10 Zone Valve Control Heating, IWH w/TPI Control, 1 Circulators

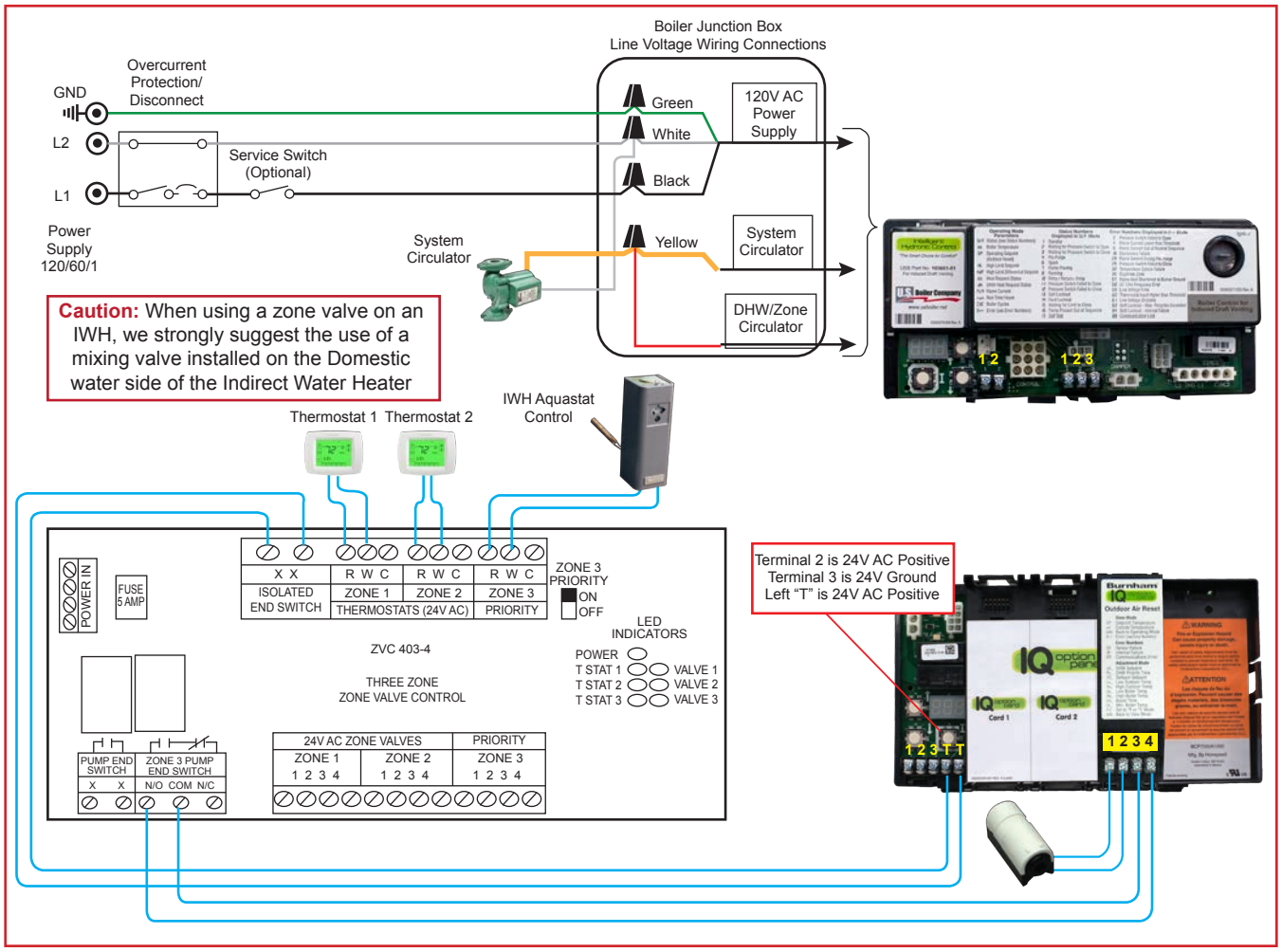


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing a zone valve control and a DHW demand from a TPI control.

- The zone control end switch wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The zone 3 pump end switch wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". Priority time and DHW setpoint can be set on the IQ Outdoor Reset Option Card.
- Wiring the zone valve control "zone pump end switch" to DHW terminals will avoid the boiler temperature delayed start used on heat demand and provides a DHW setpoint.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and the TPI control.

3.11 Zone Valve Control Heating, IWH w/Aquastat Control, 1 Circulator

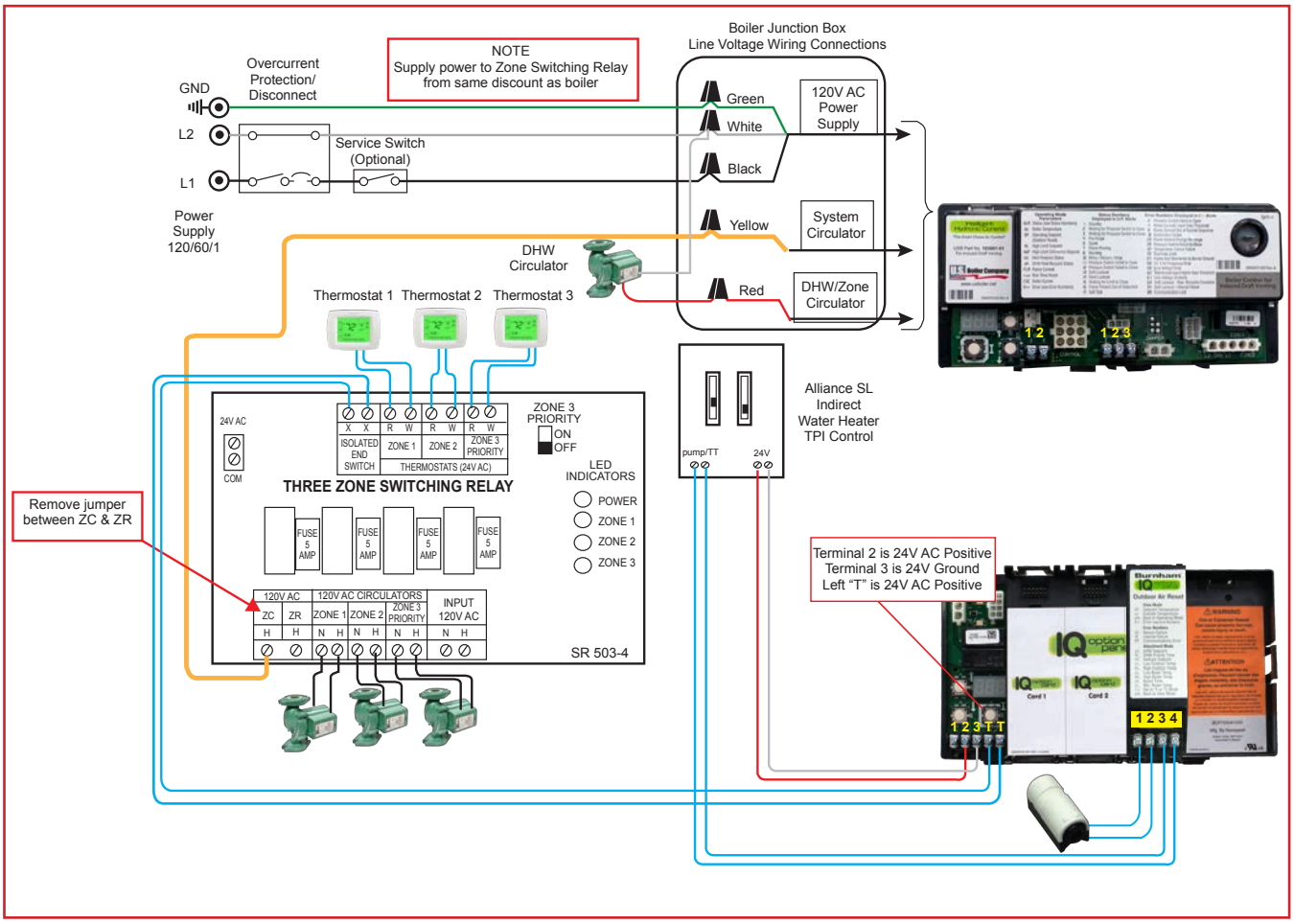


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing a zone valve control and a DHW demand from an Aquastat control.

- The heating zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The zone 3 pump end switch wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh". Priority time and DHW setpoint can be st on the IQ Outdoor Reset Option Card.
- Wiring the zone valve control "zone pump end switch" to DHW terminals will avoid the boiler temperature delayed start used on heat demand and provides a DHW setpoint.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.

3.12 Zone Switching Relay Heating, IWH w/TPI Control

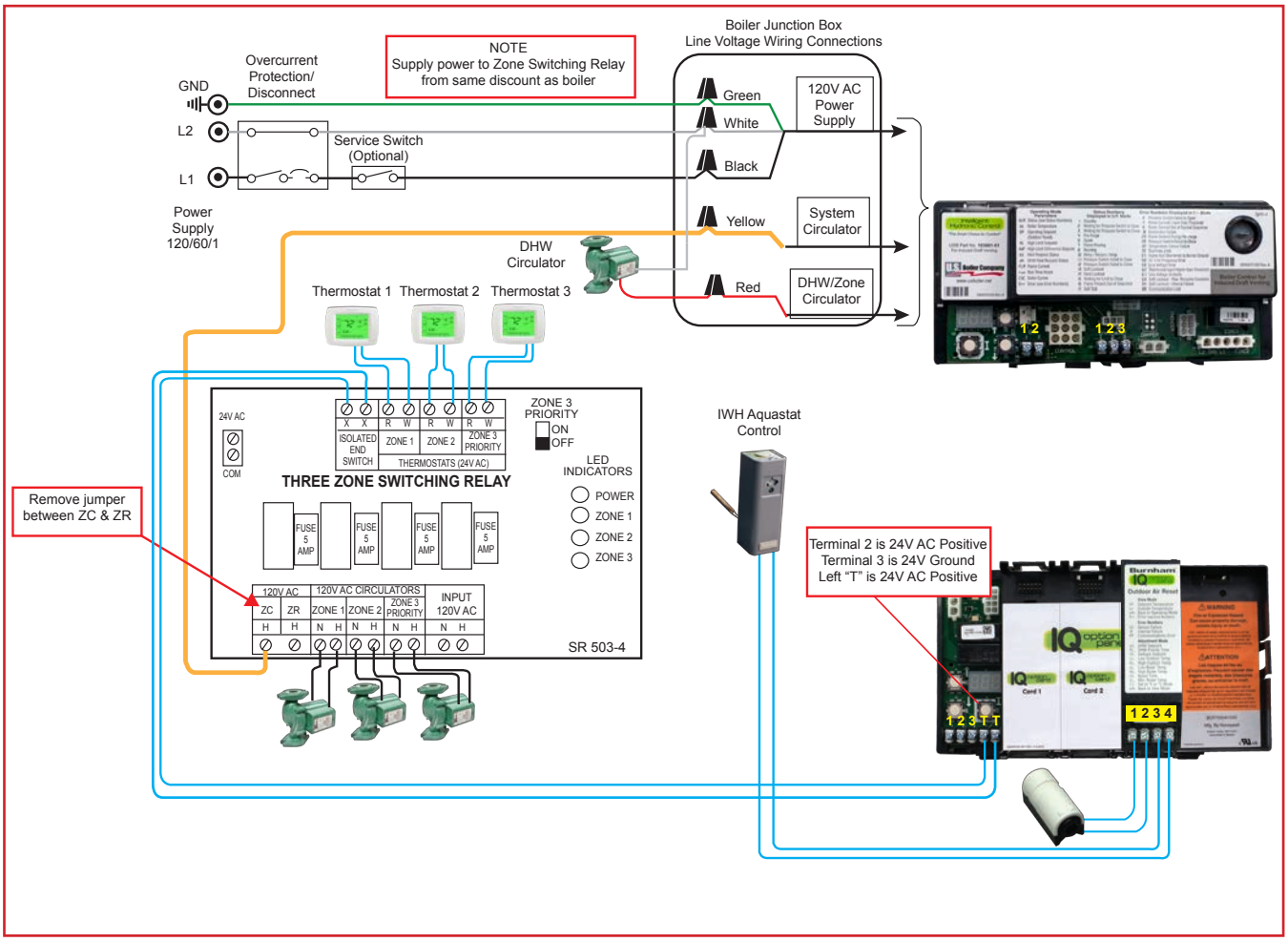


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing a zone switching relay and a DHW demand from a TPI control.

- The heating zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh".
- Priority time (Pt) on the ODR card must be set > "0". See instructions on page 24.
- The IQ Outdoor Reset Option Card will raise or lower the heating system water temperature setpoint based on measured outside air temperature and will be overridden on a DHW demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP and TPI control.

3.13 Zone Switching Relay Heating, IWH w/Aquastat Control

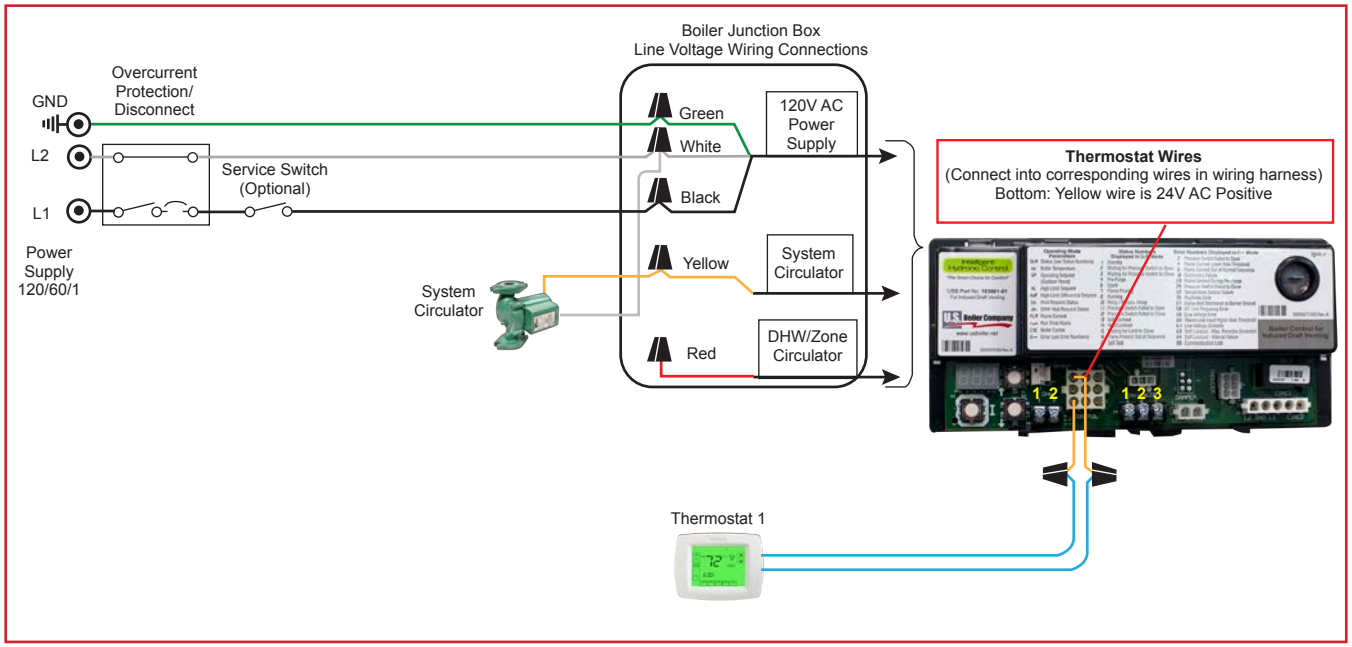


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing a zone valve control and a DHW demand from an Aquastat control.

- The heating zone valve end switches wired to the OCP "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The zone 3 pump end switch wired to the IQ Outdoor Reset Option Card "3" & "4" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh".
- The Priority time (Pt) on the ODR card must be set to > "0". See instruction on page 24.
- When the zone valve control "zone pump end switch" to DHW terminals will avoid the boiler temperature-delayed start used on heat demand and provides a DHW setpoint.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the OCP.

4.1 Single Zone Heating

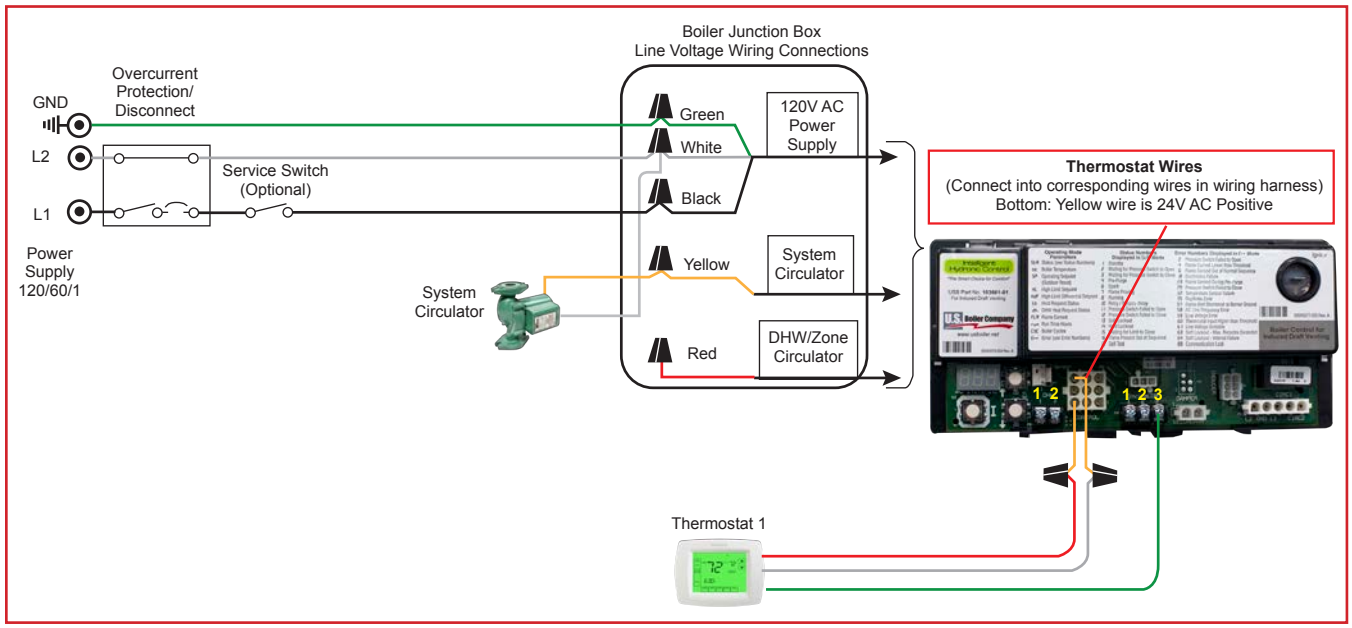


Explanation:

This arrangement can be used when an IQ gas boiler is connected to a single zone heating system

- A thermostat wired to the IHC "TT" terminals provide a heating demand and energizes the yellow system circulator wire.

4.2 Single Zone Heating, Power Stealing Thermostat

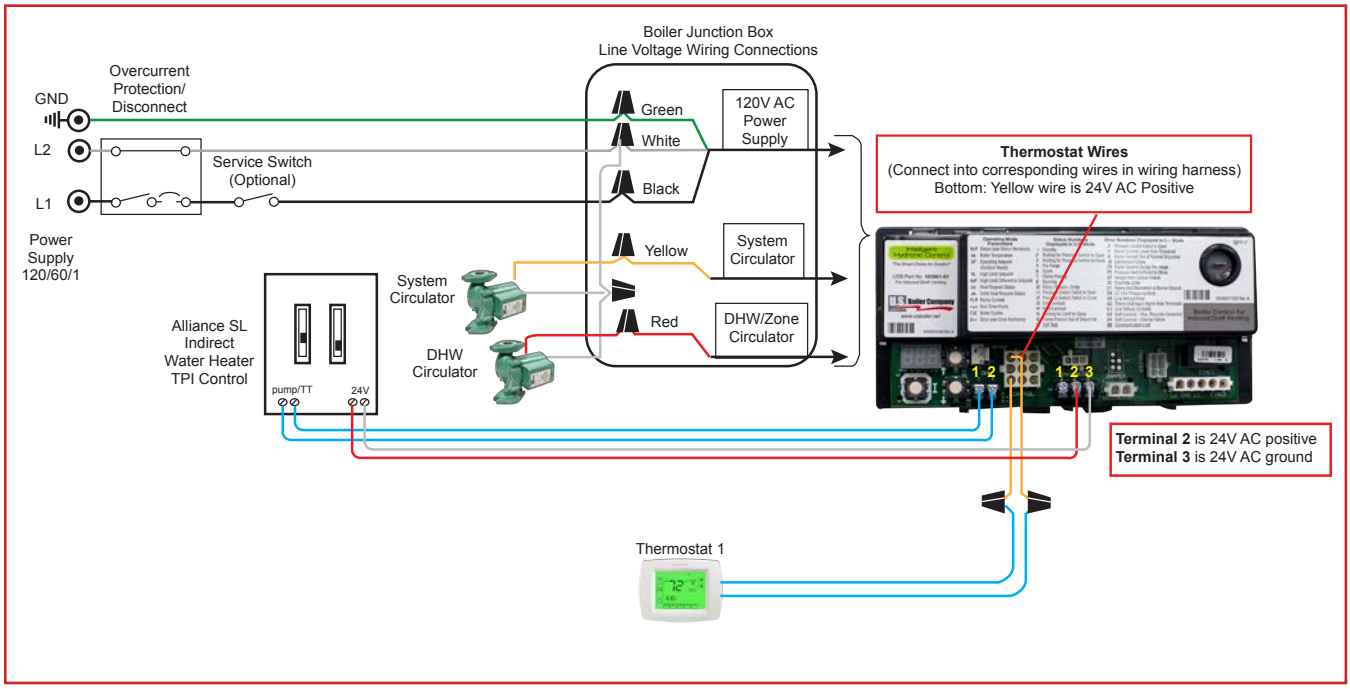


Explanation:

This arrangement can be used when an IQ gas boiler is connected to a single zone heating system with a power stealing thermostat

- A thermostat wired to the IHC "TT" terminals provide a heating demand and energizes the yellow system circulator wire.

4.3 Single Zone Heating, IWH w/TPI Control

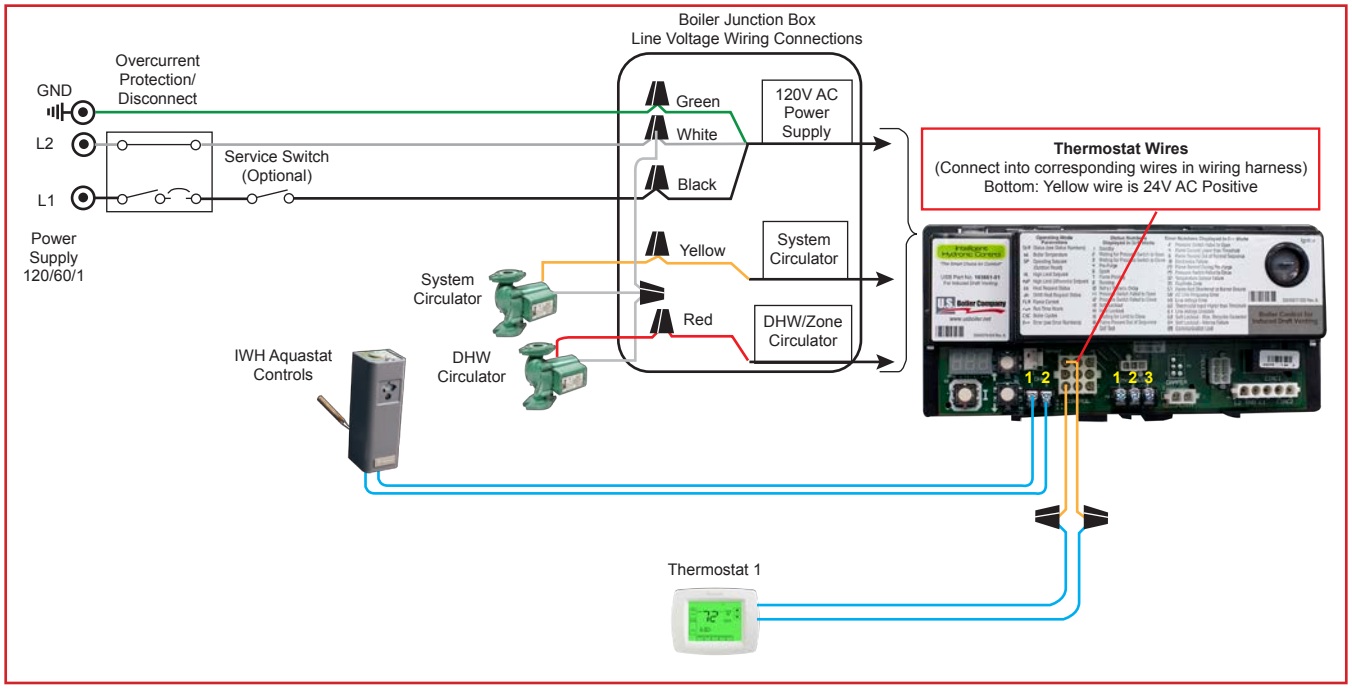


Explanation:

This arrangement can be used when there is a single heat zone and a DHW demand from a TPI control.

- The heating zone valve end switches wired to the IHC "TT" terminals provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC "1" & "2" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC and TPI control.

4.4 Single Zone Heating, IWH w/TPI Control

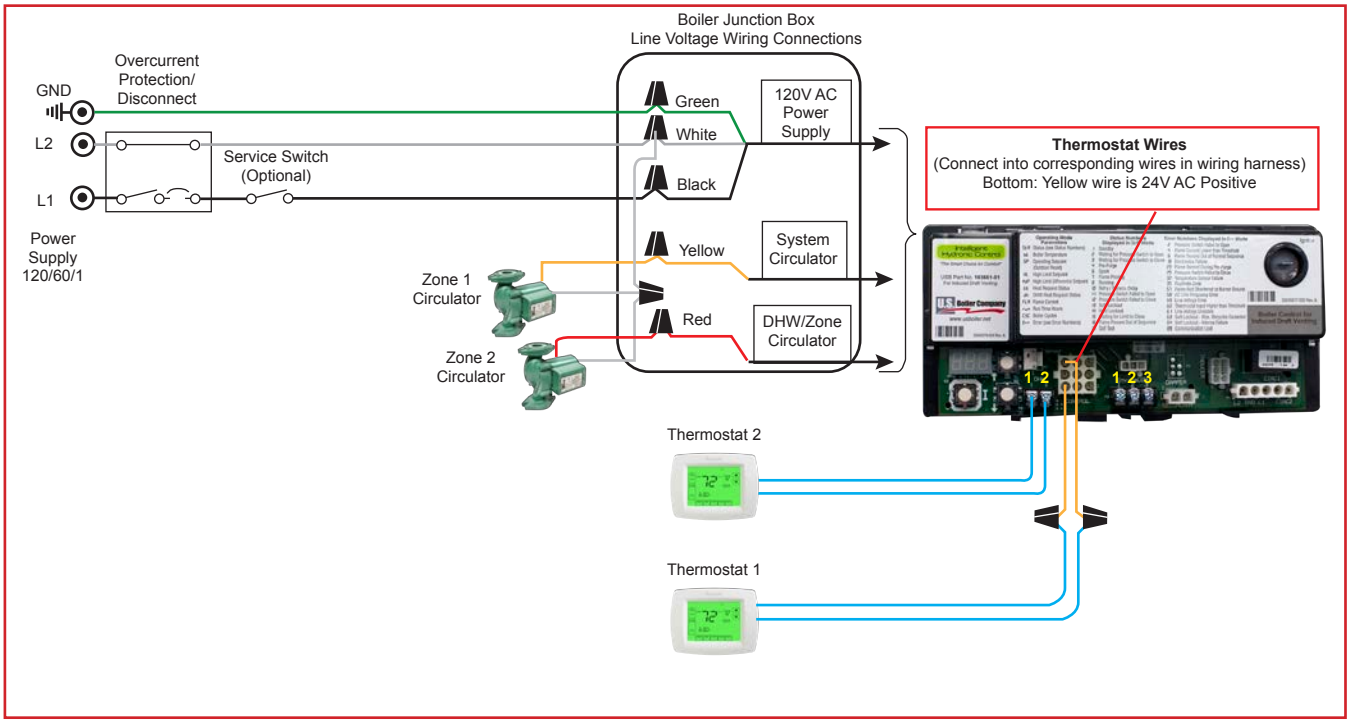


Explanation:

This arrangement can be used when there is a single heat zone and a DHW demand from an Aquastat control.

- A thermostat wired to the IHC "TT" wires provide a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control wired to the IHC "1" & "2" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.

4.5 Two Zone Heating

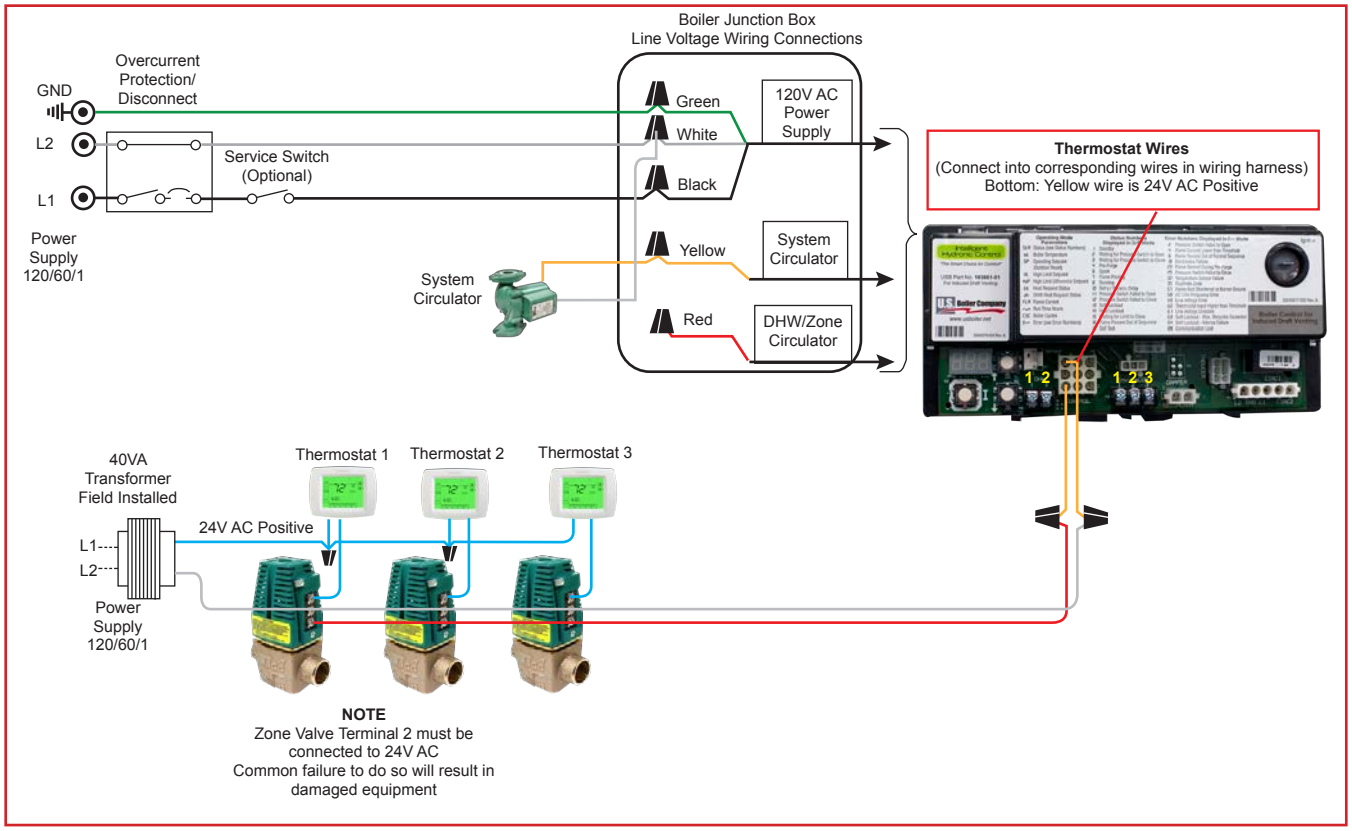


Explanation:

This arrangement allows the boiler to respond to two heating demands through the IHC control and operate both circulators without priority

- A Zone 1 thermostat wired to the IHC “TT” wires provide a Zone 1 heating demand and energizes the yellow system circulator wire. A Zone 2 thermostat wired to the IHC “1” & “2” terminals provides a Zone 2 demand and energizes the res DHW/Zone circulator wire.
- The IHC parameter “dh” must be set to “tt2” and when the “Pt” Priority Time parameter is ignored so both circulators can run simultaneously.

4.6 Zone Valve Heating

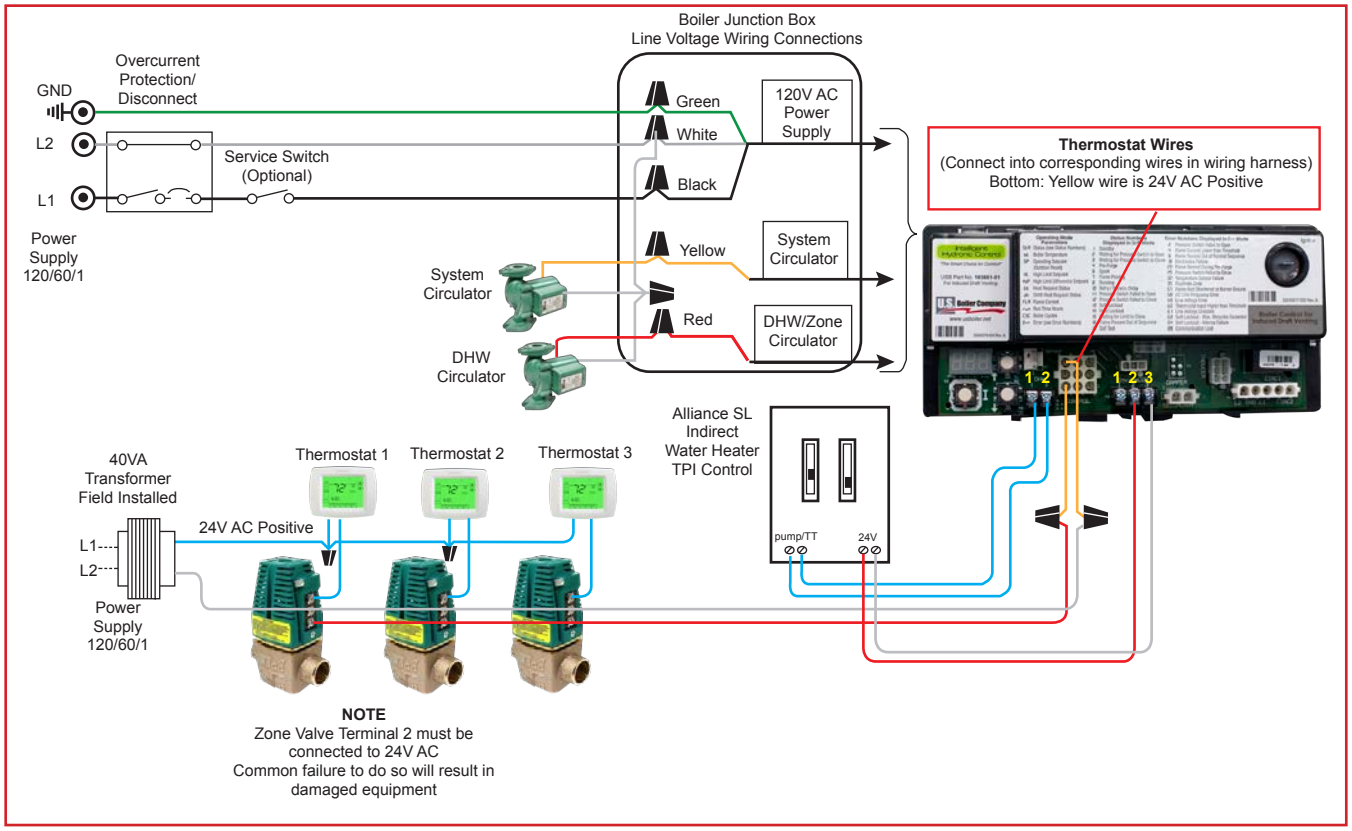


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves

- The zone valve end wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC

4.7 Zone Valve Heating, IWH w/TPI Control, 2 Circulators

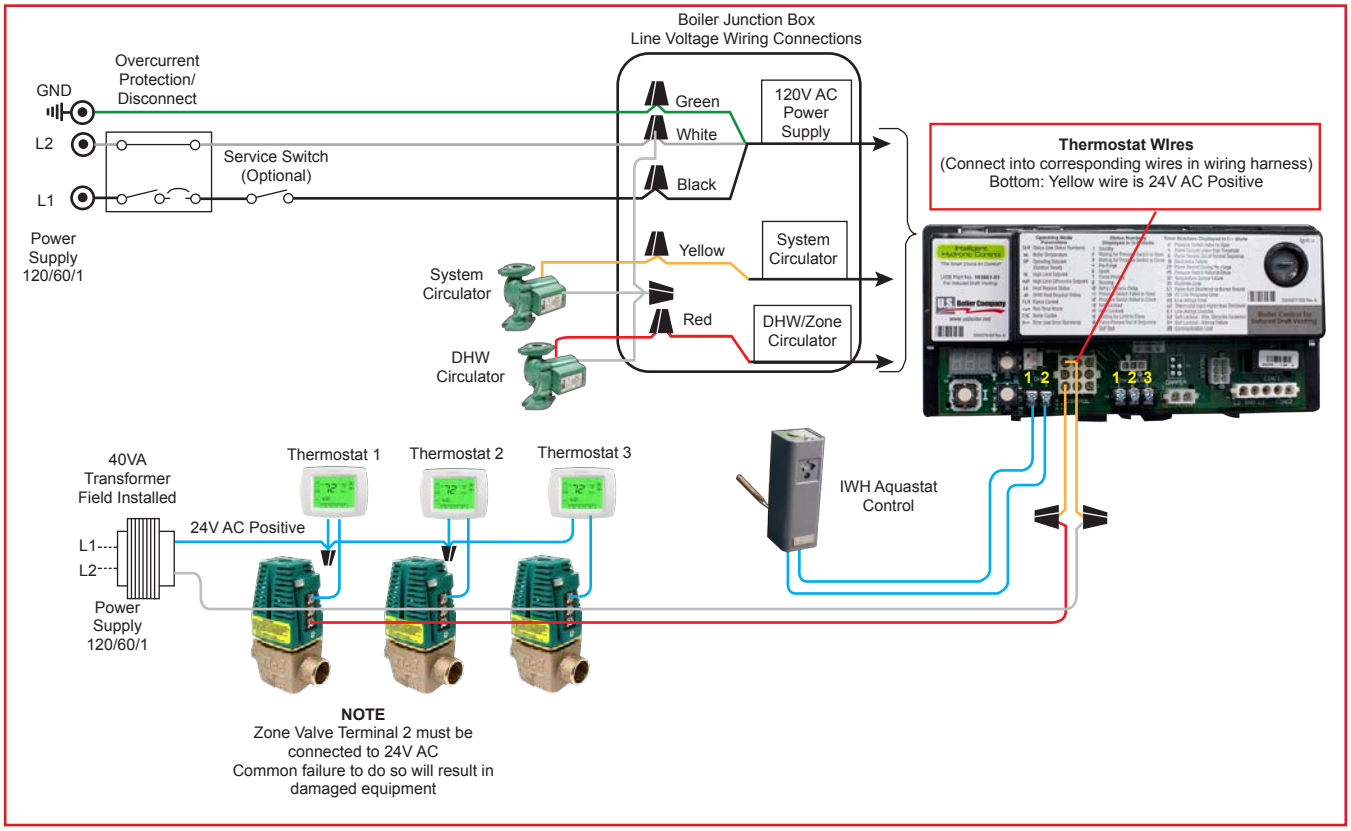


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from a TPI control.

- The zone valve end wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC “1” & “2” terminals provides a Zone 2 demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter “dh” must be set to “dh” and when the “Pt” Priority Time parameter is set to “on”, it will prioritize the IWH without a time out period
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC and TPI control.

4.8 Zone Valve Heating, IWH w/Aquastat Control, 2 Circulators

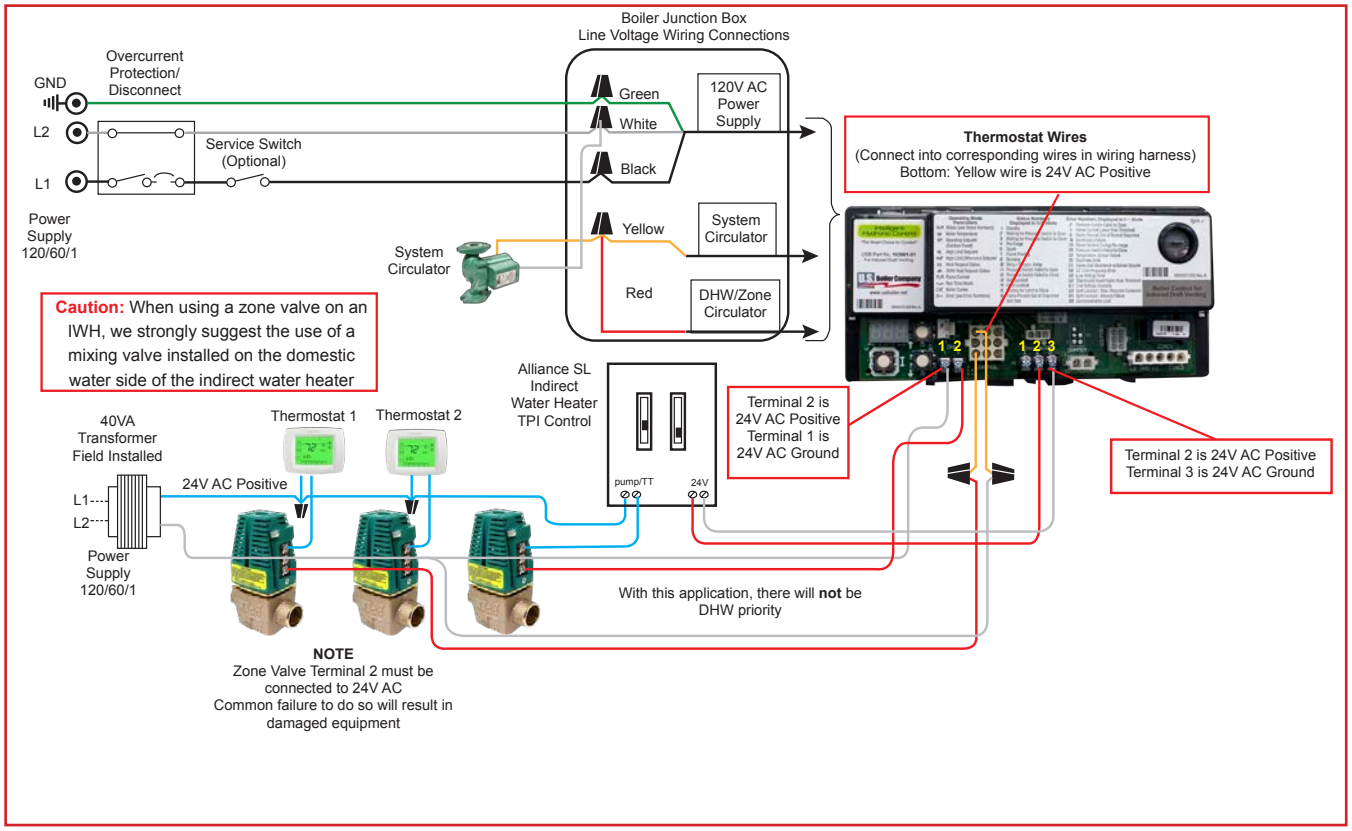


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from an Aquastat control.

- The zone valve end wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC “1” & “2” terminals provides a Zone 2 demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter “dh” must be set to “dh” and when the “Pt” Priority Time parameter is set to “on”, it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC.

4.9 Zone Valve Heating, IWH w/TPI Control, 1 Circulator, No Priority

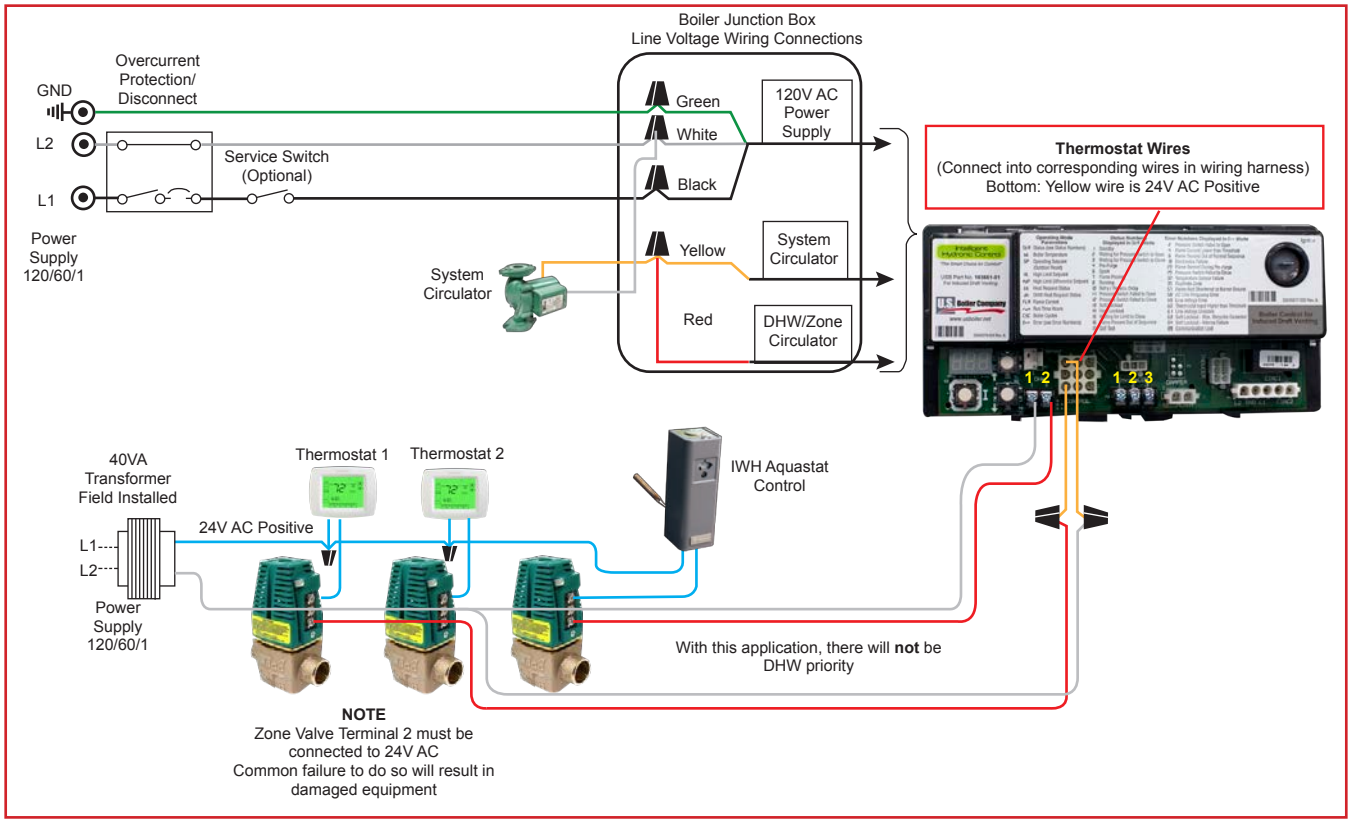

Boiler Junction Box
Line Voltage Wiring Connections
Overcurrent Protection/ Disconnect
GND
L2
L1
Service Switch (Optional)
Power Supply 120/60/1
Green
White
Black
120V AC Power Supply
Yellow
System Circulator
Red
DHW/Zone Circulator
System Circulator
Thermostat Wires
(Connect into corresponding wires in wiring harness)
Bottom: Yellow wire is 24V AC Positive
Caution: When using a zone valve on an IWH, we strongly suggest the use of a mixing valve installed on the domestic water side of the indirect water heater
Alliance SL Indirect Water Heater TPI Control
pump/TT
24V
Terminal 2 is 24V AC Positive
Terminal 1 is 24V AC Ground
Terminal 2 is 24V AC Positive
Terminal 3 is 24V AC Ground
40VA Transformer Field Installed
Thermostat 1
Thermostat 2
24V AC Positive
L1
L2
Power Supply 120/60/1
With this application, there will not be DHW priority
NOTE
Zone Valve Terminal 2 must be connected to 24V AC
Common failure to do so will result in damaged equipment

Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from a TPI control.

- The zone valve end wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control connected zone valve end switch wired to the IHC “1” & “2” terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter “dh” must be set to “dh” and when the “Pt”. There is no priority in this application due to using only one circulator.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC and TPI control.

4.10 Zone Valve Heating, IWH w/Aquastat Control, 1 Circulator, No Priority

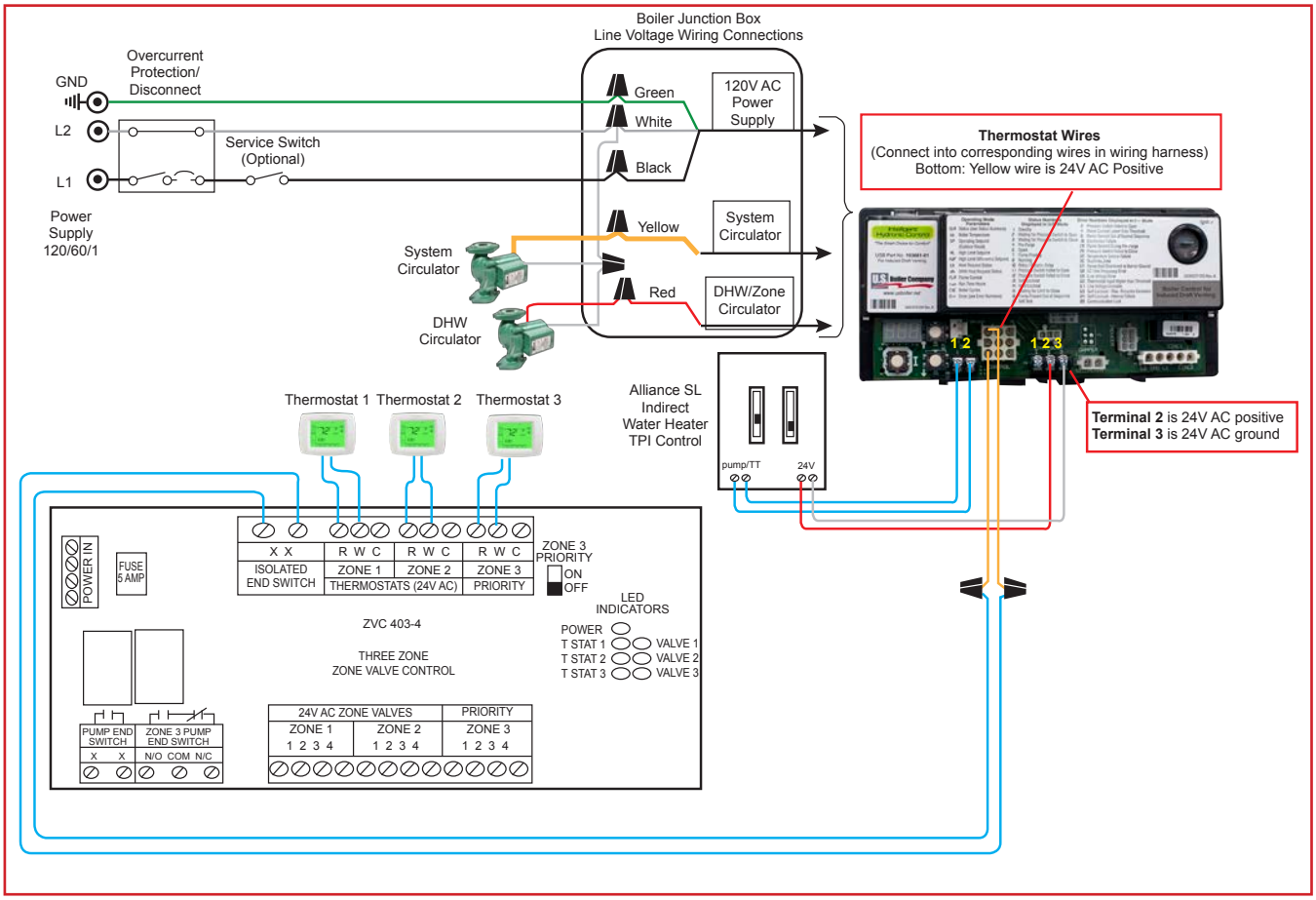


Explanation:

This arrangement allows the boiler to respond to a space heating demand utilizing Taco 3-wire zone valves and a DHW demand from an Aquastat control.

- The heating zone valve end wired to the IHC "TT" wires provide a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control connected zone valve end switch wired to the IHC "1" & "2" terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter "dh" must be set to "dh" and when the "Pt". There is no priority in this application due to using only one circulator.
- Wiring the DHW zone valve end switch to the IHC will avoid the boiler temperature delayed start used on heat demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC and TPI control.

4.11 Zone Valve Control Heating, IWH w/TPI Control, 2 Circulators

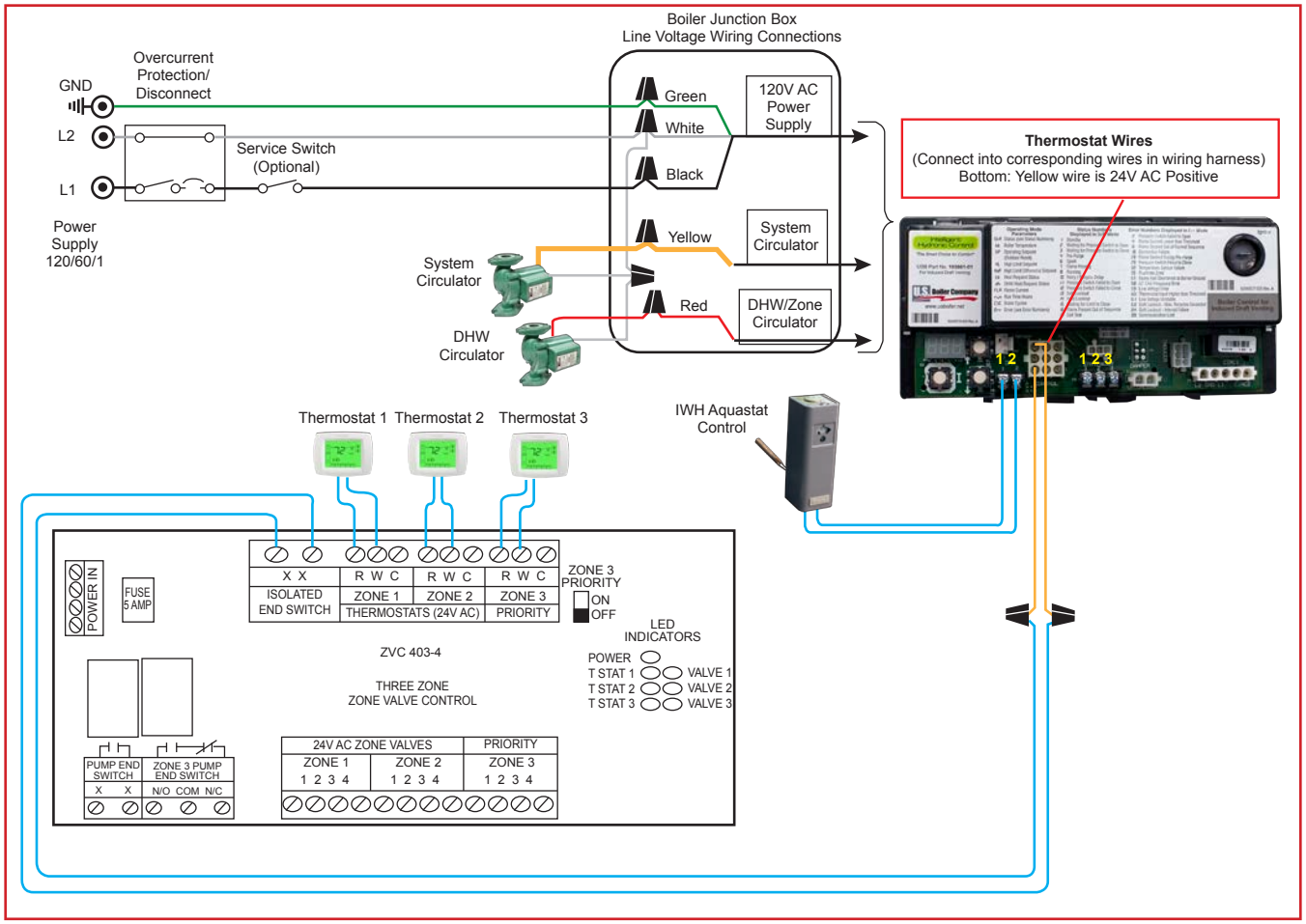


Explanation:

This application uses a zone valve control for heating demands and the DHW demand wired directly to the IHC control utilizing two circulators, and offers priority.

- The zone valve end wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC “1” & “2” terminals provides a DHW demand and energizes the red DHW/Zone circulator wire.
- The IHC parameter “dh” must be set to “dh” and when the “Pt” Priority Time parameter is set to “on”, it will prioritize the IWH without a time out period
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC and TPI control.

4.12 Zone Valve Control Heating, IWH w/Aquastat Control, 2 Circulators

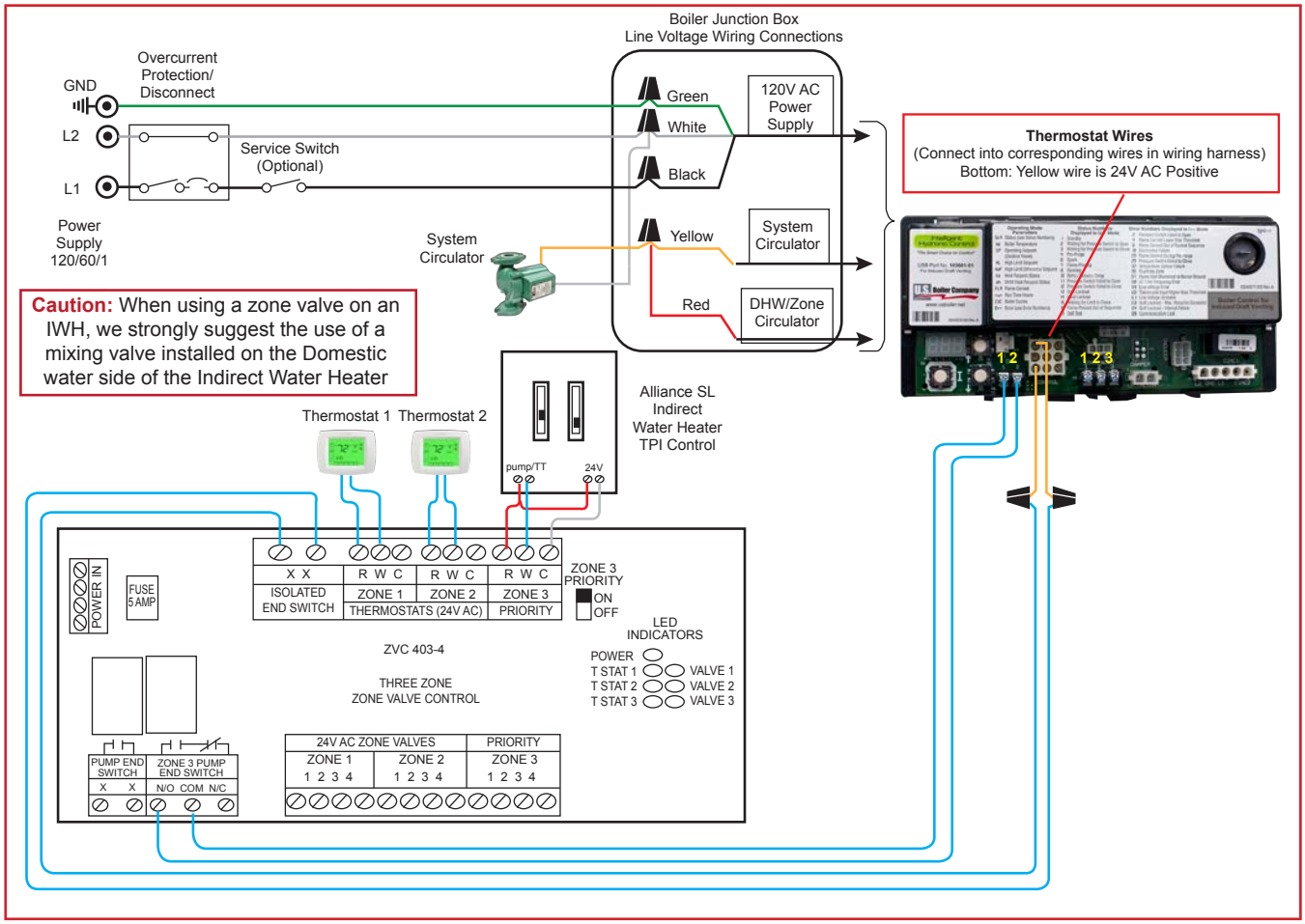


Explanation:

This application uses a zone valve control for heating demands and the DHW demand wired directly to the IHC control utilizing an Aquastat.

- The zone control end switch wired to the IHC "TT" wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC "1" & "2" terminals provides a DHW demand and energizes the red DHW/ Zone circulator wire.
- The IHC parameter "dh" must be set to "dh" and when the "Pt" Priority Time parameter is set to "on", it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the IHC control.

4.13 Zone Valve Control Heating, IWH w/TPI Control, 1 Circulator

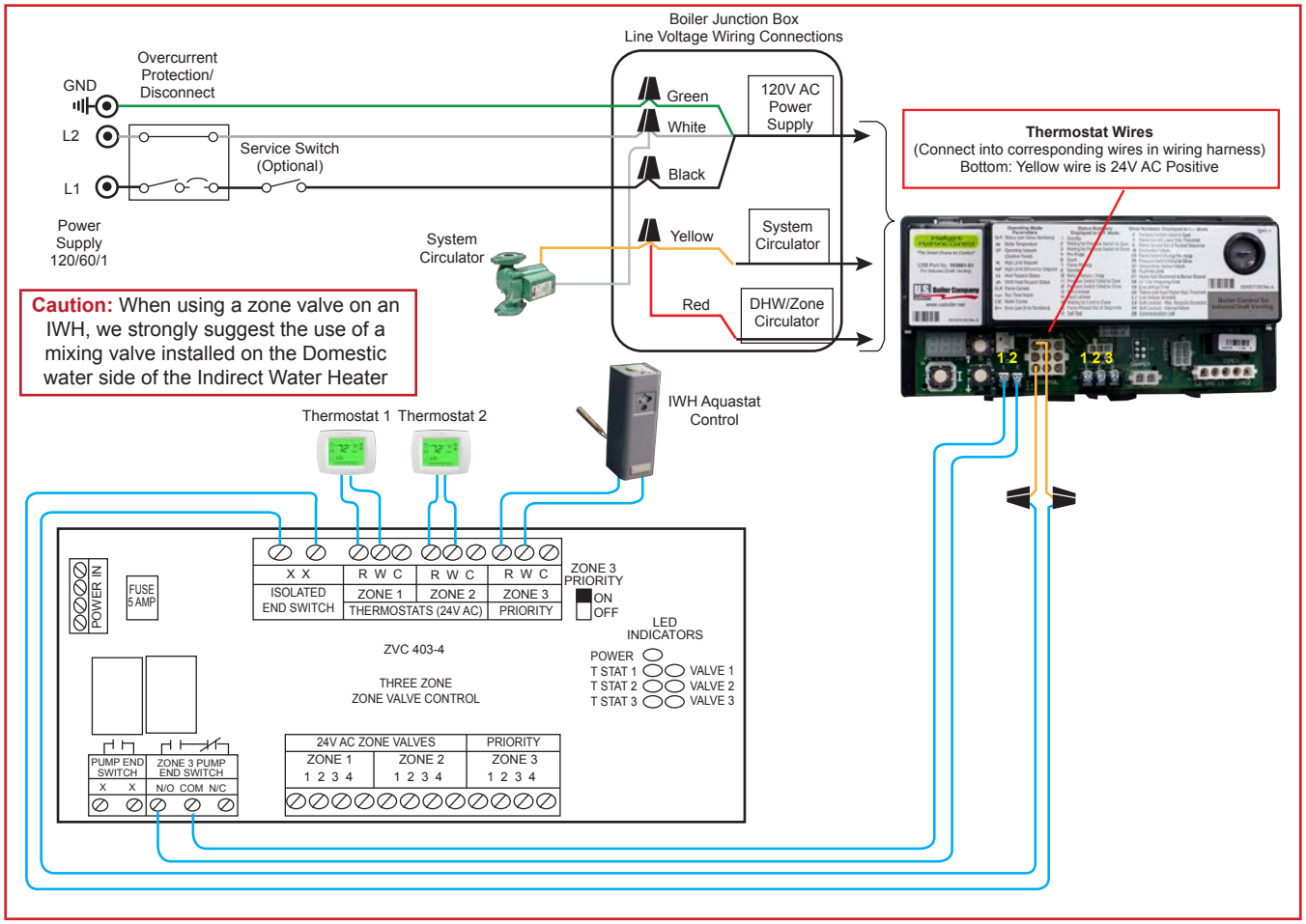


Explanation:

This application uses a zone valve control for heating demands and the DHW demand wired directly to the IHC control utilizing one circulator. Priority is controlled by the zone valve relay control.

- The zone control end switch wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC “1” & “2” terminals provides a DHW demand and energizes the red DHW/ Zone circulator wire.
- The IHC parameter “dh” must be set to “dh”. There is no circulator priority in this application due to using only one circulator.
- Wiring the zone valve control “zone pump 3 end switch” to DHW terminals will avoid the boiler temperature delayed start used on heat demand.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid possible damage to the TPI control.

4.14 Zone Valve Control Heating, IWH w/Aquastat Control, 1 Circulator

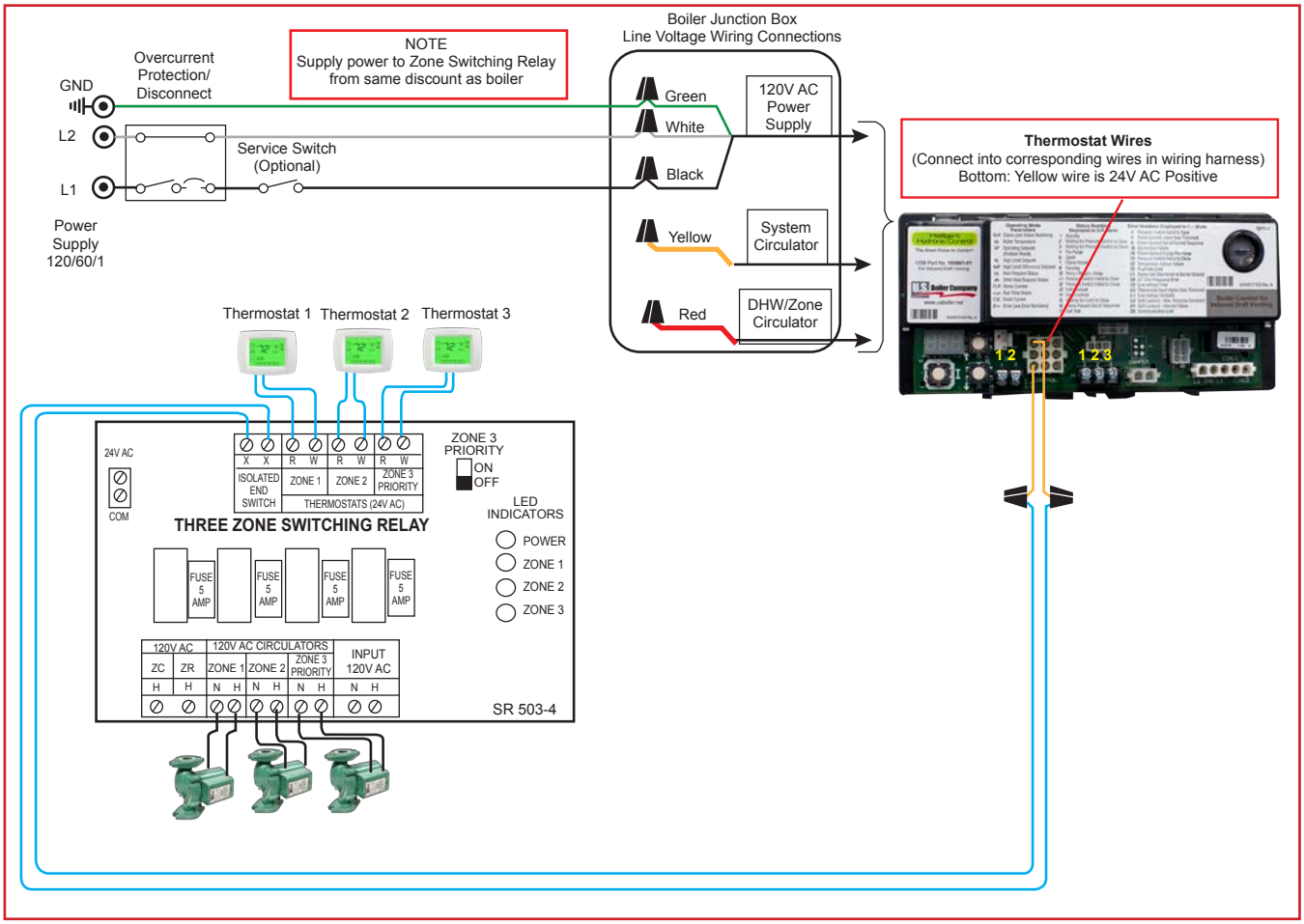


Explanation:

This application uses a zone valve control for heating demands and the DHW demand wired directly to the IHC control utilizing one circulator. Priority is controlled by the zone valve relay control.

- The zone control end switch wired to the IHC “TT” wires provide a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC “1” & “2” terminals provides a DHW demand and energizes the red DHW/ Zone circulator wire.
- The IHC parameter “dh” must be set to “dh”. There is no circulator priority in this application due to using only one circulator.
- Wiring the zone valve control “zone pump 3 end switch” to DHW terminals will avoid the boiler temperature delayed start used on heat demand.

4.15 Zone Switching Relay Heating

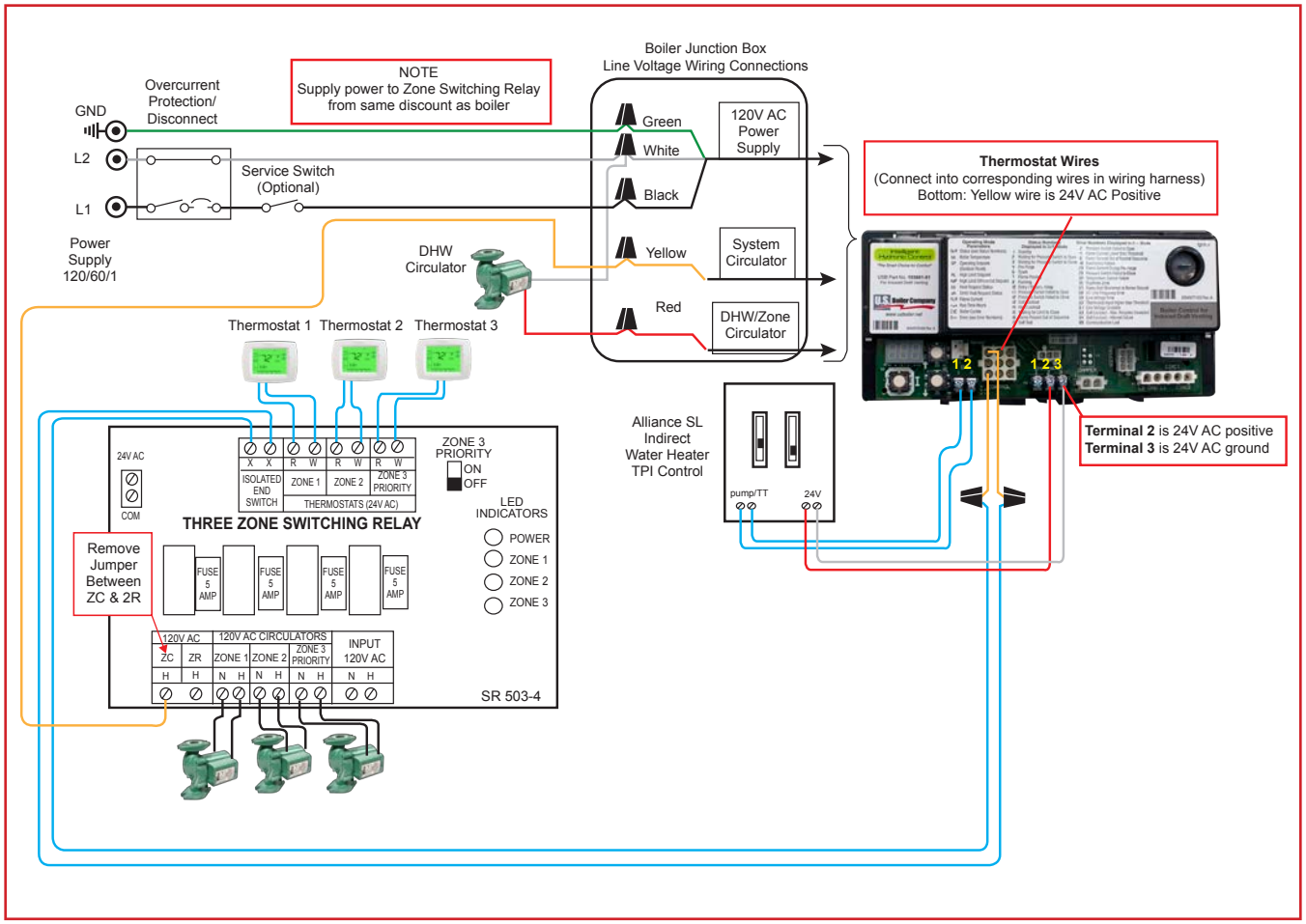


Explanation:

This arrangement allows the boiler to respond to heating demands and control all the circulators from a zone switching relay.

- The zone switching relay end switch wired to the IHC “TT” wires provides a heating demand and energizes the yellow system circulator wire.

4.16 Zone Switching Relay Heating, IWH w/TPI Control

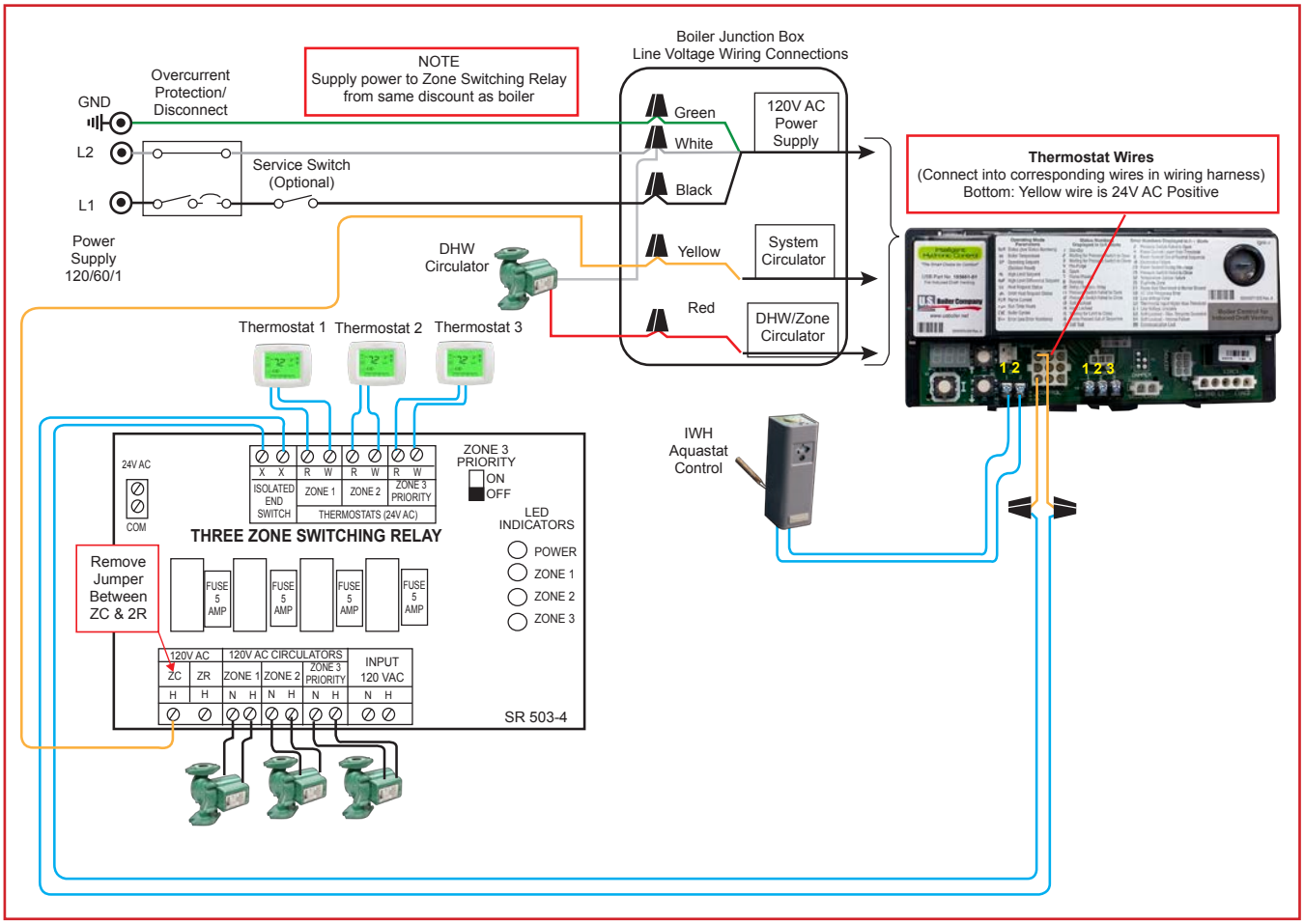


Explanation:

This arrangement allows the boiler to respond to heating demands and control all the circulators from a zone switching relay. DHW is controllled by the TPI control.

- The zone switching relay end switch wired to the IHC “TT” wires provides a heating demand and energizes the yellow system circulator wire. The TPI Control wired to the IHC “1” & “2” terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- A heat demand will energize the yellow wire which will supply voltage to the zone pumps via the “ZC” terminals on the zone relay. When the DHW demand activates, the IHC will de-energize the yellow system circulator wire and energize the red DHW circulator. When the DHW demand expires, the IHC will de-energize the red wire and re-energize the yellow wire providing there is still a call for heat.
- The IHC parameter “dh” must be set to “dh” and when the “Pt” Priority Time parameter is set to “on”, it will prioritize the IWH without a time out period.
- CAUTION: Proper polarity must be maintained on the red and white wires to avoid damge to the IHC and TPI control.

4.17 Zone Switching Relay Heating, IWH w/Aquastat Control



Explanation:

This arrangement allows the boiler to respond to heating demands and control all the circulators from a zone switching relay. DHW is controllled by an Aquastat control.

- The zone switching relay end switch wired to the IHC “TT” wires provides a heating demand and energizes the yellow system circulator wire. The IWH Aquastat Control wired to the IHC “1” & “2” terminals provide a DHW demand and energizes the red DHW/Zone circulator wire.
- A heat demand will energize the yellow wire which will supply voltage to the zone pumps via the “ZC” terminals on the zone relay. When the DHW demand activates, the IHC will de-energize the yellow system circulator wire and energize the red DHW circulator. When the DHW demand expires, the IHC will de-energize the red wire and re-energize the yellow wire providing there is still a call for heat.
- The IHC parameter “dh” must be set to “dh” and when the “Pt” Priority Time parameter is set to “on”, it will prioritize the IWH without a time out period.

NOTES

NOTES

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